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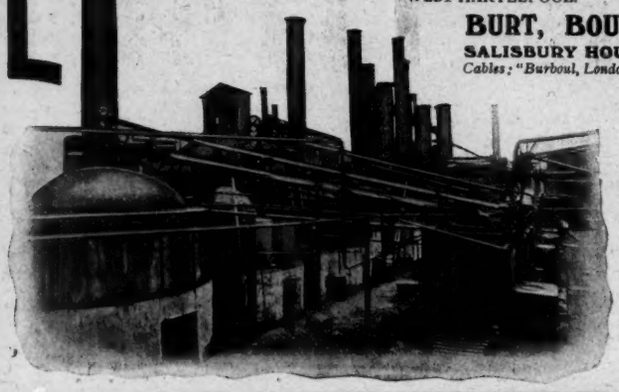

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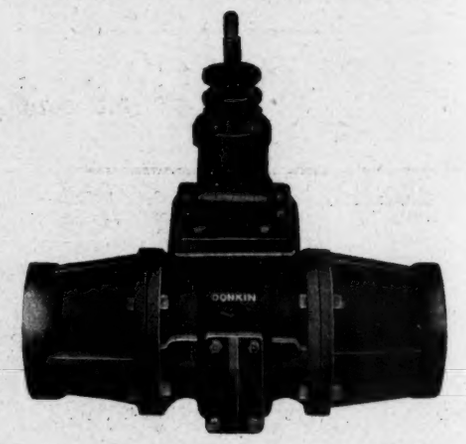

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EDITORIAL NOTES.

A Utilitarian Memorial to Sir Corbet Woodall.

GREAT men do not need memorials to remind their contemporaries of them; but their contemporaries may, and often do, desire to pay in some tangible form homage to their memories. That desire is engendered by their respect and regard for both the men and their work, and also because they are jealous of their own great men, and do not wish those who come after to forget that there preceded them men who were honoured for their valuable and inspiring part in the activities and work of their day—men who moved among their fellows as leaders, men who did much to quicken and to add to those things which were constructive in their own particular spheres. We have had many such men in the gas industry, and in our own age. Two of them have been chosen by their contemporaries and fellow workers in the industry for signal honour. Memorials have been selected by those among and for whom they laboured and gave of their best; and those memorials have a strong compatibility with what we know were the inclinations and the ambitions of two fertile minds. The memorials are to-day, with joint purpose, part of the fabric and work of the Leeds University; and they will always keep in the memories of that continuous stream of men flowing into the technical operations of the industry the magnificent part taken in advancing its affairs by Sir George Livesey and Sir Corbet Woodall. They were outstanding in unceasing and successful effort.

It now seems long ago that the Chair was established at the Leeds University to commemorate the life and work in the industry of Sir George Livesey; and now we have what may be regarded as the complementary part to the work of the Livesey Chair in the specially designed experimental gas plant which has—through the initial munificence of Mr. Henry Woodall, who was professionally associated with his father—been erected for the Coal Gas and Fuel Department of the University as a memorial to Sir Corbet Woodall. As the days and lives of these two industrial leaders were linked together, so their memorials unite them in one common object—the development of men, knowledge, and research destined to contribute to the advance of the interests and the increased stabilization of the industry in and for which their respective lives were largely spent. Nothing could be more appropriate than that the constructive work of Sir George and Sir Corbet should have memorials which have constructive aims. Though what was mortal of our two friends has passed away, their thoughts, desires, ambitions, and inspiration still live. They had a profound belief in the large potentialities of the industry for development. They strove for realization within the ambit of their opportunities; and part of their work in this direction is being carried on with that unison which is the common characteristic of all scientific endeavour.

The new experimental plant which commemorates the life and work of Sir Corbet in the gas industry has been long in being brought to completion. This has been advantageous; for time has given to it a greater perfection and serviceability than it would have had if there had been confinement to the original intention. No one is more delighted over this than Mr. Henry Woodall and Prof. Cobb. The years since 1917, when the offer of a plant was made by the former, have enabled the incorporation of ideas that have come with the development of knowledge; they have supplemented the funds necessary to completeness by voluntary contribution from gas undertakings and friends identified with the manufacturing side of the industry; and there has been supplied free by manufacturing firms plant to suitable design for precision in the work of research. In this memorial, as in other co-operative work, the manufacturers rightly desired to have part, and to be recognized as having a common interest in the progress of the industry. They know that their own prosperity is contingent upon that of the gas-supply industry; and therefore to contribute all they can to the progress of the latter is to their own material advantage. Mr. Henry Woodall, in his speech at the inauguration of the experimental plant last Wednesday, acknowledged not only the substantial assistance rendered by gas undertakings to the memorial scheme, and the part that it will have in adding to the efficiency and scope of the work of the Coal Gas and Fuel Department at the University, but he mentioned those firms who have brought the plant to its present finished state by supplying important components. He also stated that the conception of the memorial was that of Mr. Walter T. Dunn. We will not describe the plant here; this is done in other columns. But it may be said that it constitutes not merely a complete small gas-works, but it has been deliberately designed, as Prof. Cobb said, to secure elasticity in working and the precision necessary for the prosecution of research. At any time or place, temperature and other conditions can be ascertained or controlled, and the products can be collected. Not only will the plant be an important feature in the work of the Coal Gas and Fuel Department, but we are confident it will do much to throw light on dark places in our carbonizing practices, and so tend to raise our manufacturing efficiencies and economies. The President of the Institution of Gas Engineers (Mr. Samuel Tagg) was right when he said at the inauguration that there never was a time when the industry was more desirous of guidance in the problems of carbonization which must arise from the sale of gas on the thermal basis. Some considerable amount of guidance, it is certain, will be obtained from the plant; and it will, as Alderman Charles Tetley, M.A., LL.D., indicated, contribute to a greater accuracy of thought, knowledge, and manipulation in carbonization. It will also help in the work of superseding rule-of-thumb by scientific procedure.

The memorial having been established and the gift handed over to the University and the Coal Gas and Fuel Department, there is ample assurance that good use will be made of it. It will be regarded as a trust by Prof. Cobb; and by him and his staff there will be no violation of that trust by any lack of diligence and care in the work taken in hand. Enthusiasm has already framed a good programme of research along various important lines. The Pro-Chancellor described the plant as a new asset to the University. There is no doubt it will be to the Department with which it is specially associated, and in which there has hitherto been an omission in the equipment. That omission has now been rectified; and this, we think, will be an important factor in the choice of Leeds as their *alma mater* by those who have aspirations for technical position in the gas industry. We hope in every respect success will follow the work through the many avenues that the plant opens up. From the memorial subscriptions a small sum remains which will serve as the nucleus of an endowment. Seeing that research and plant maintenance cost money, anyone who is attracted by this new feature in our industrial equipment for investigation, and desires to have a personal part in the work, should keep in mind the small endowment, and do the practical thing which will produce its enlargement. An account of the proceedings at the inauguration of the memorial, with an illustrated description, will be found in a later part of this issue of the "JOURNAL."

The York Gas Company's Centenary.

Some twelve years ago we were celebrating the centenary of the Gas Light and Coke Company. There have been other centenaries of gas undertakings since then; and now we may expect quite a good crop of them, for a hundred years ago in many cities and towns the adoption of gas lighting was being discussed. But who then knew to what great public service gas supply was going to develop? Even to-day, with the marvellous progress made, we cannot define its limits. Last week the centenary of the York Gas Company was celebrated. It is right that York should be early in the field in having a century-old gas history. We are glad it has been. York has its foundations deeply embedded in history; and it can show many things which belong to the ages, and are the cherished possessions of the present. But while York can boast that it has a Gas Company with a record of a hundred years' service behind it, there is failure to find upon it the marks and doings of old age. That is where it is altogether out of keeping with much else that has had long life in the grand old city, excepting in one or two respects. It still has in use a chimney which is part of the gas-works which were built in 1837. It has also preserved a wonderful collection of old manuscripts and of gas-consuming appliances—lighting and cooking, which contributed a considerable amount of interest to the fascinating centenary exhibition organized by the Engineer and Manager, Mr. Harold E. Bloor, B.Sc., B.Eng. Its history is not memorialized by ancient buildings and customs. It is found in records and prints, and in the substantial concern that has been developed during the century, as new knowledge and appliances permitted.

Like many other gas undertakings—the older the York Company has grown, the greater has become its vitality and activity. This is due to progressiveness—to adaptability to the times and to the requirements, by the adoption of plant and technical and trading methods which not only maintain, but increase, strength. For instance, combined with the centenary celebrations last week was the inauguration of a Glover-West vertical retort plant; and anyone who reads (in later columns) the reprint of the daintily prepared brochure which was distributed among the many visitors to York last week will see how the Company have for some time been practising, with excellent results, methods the propriety of which many other undertakings are only now considering, and upon which they are taking long to make up their minds. In 1901, maintenance of consumers' fittings on reasonable terms was adopted; and this business has attained considerable proportions. Then in 1921 the Company inaugurated the system of house-to-house inspection of gas installations, with the object of ascertaining the condition of all the gas apparatus in use in the area of supply, and making adjustments where necessary. This work has been made a permanent feature of the Company's system, and the staff has been increased for the purpose. The testimony is that this practice has given great satisfaction to the consumers. While the affairs of a gas undertaking are conducted in a manner which so increases vitality, it can never grow old. There is always new life about it, and new work to be done. York is not a city that presents opportunities for great flights in expansion of the gas business; but the data show an ever-growing ascent in consumption. In 1903, the sales of gas amounted to 492,781,000 c.ft.; in 1923, to 632,678,000 c.ft.—an increase of close upon 30 p.ct. A gas concern that can exhibit such trading enlargement in the circumstances of a city of the kind is an evidence of a high standard of business efficiency and enterprise.

To the civic congratulations to the Company, and to those from the numerous representatives of the gas industry who were present (largely augmented by the accompanying district conference of the "B.C.G.A.") we heartily add our own. Certain are we that the progressive policy which has carried the Company so far will be continued, and that the undertaking will pass from success to success not only to its own advantage, but to that of the citizens generally. Throughout the two days occupied by the centenary celebrations, the inauguration of the vertical retort installation, and the district conference of the "B.C.G.A.," Mr. Alfred Procter, the Chairman of the Company, and his directorial colleagues, with Mr. Bloor, were the cheeriest and most generous of hosts. The proceedings will find place among the happiest of recollections.

[Comments on the proceedings at the district conference of the "B.C.G.A." will be published next week.]

A Critical Coal Position—The Definitive Demand.

The position regarding the question of the wages of the coal miners has become more critical through the inability of the coal owners, even with an amended offer, to satisfy the Executive of the Miners' Federation and a majority of the delegates from the mining districts. Last week was occupied in renewed negotiations, brought about by the intervention of the Government, who are not particularly desirous at the present juncture to face the House with a Minimum Wage Bill for the miners; and at the moment we have little doubt they are not wishful to grapple with the question of the nationalization of the mines, as they have been urged to do by the labour extremists. The Government recognize the danger points in their programme without a secure majority in the House; and they may be relied upon to step warily rather than court disaster with their eyes wide open. However, the socialist-labour members representing mining constituencies have decided to press the Government to introduce at once a Minimum Wage Bill for the miners.

The amended offer of the owners proposed a minimum increase in the general minimum rate of wages from 20 to 32½ p.ct. The ratios suggested were: A sum equivalent to 15 p.ct. of standard wages to profits, instead of the present 17 p.ct.; 87 p.ct. of wages and 13 p.ct. of profits to any surplus, instead of the present 83 p.ct. of wages and 17 p.ct. of profits. A further proposal was that no adult workman should receive less than 40 p.ct. above the lowest-paid day-wage workman (standard rate). Also that the existing subsistence wages should be increased by one-eighth. It was further provided that deficiencies in standard profits should be recouped by applying to this purpose 33⅓ p.ct. of future surplus available. The contributions of employers to pension schemes, it was suggested, should not be treated as costs of production, but must be borne by the employers themselves. Offered, too, was the proposal that anomalies created by the increase of wages to the lower-paid workmen and the workmen in receipt of rates at or near to the new rates of the lowest-paid workmen should be dealt with by the districts.

That is a summary of the new offer; and the delegates on Friday recommended that upon it a ballot of the miners should be taken, accompanied by the advice that it should be rejected. This is pure fiasco, seeing that it is a foregone conclusion as to which way the miners will vote when their own leaders give them such advice. A ballot in such circumstances is worse than useless; for most of the men would regard it as an act of disloyalty to vote against the positive recommendation of their representatives. The ballot, however, will give no authorization to declare a strike when the notice expires on April 17 to terminate the present agreement. A clear majority one way or the other will be sufficient in this ballot, which is to be taken on April 8—the figures being returnable by the 10th. A strike ballot, on the other hand, would require a two-thirds majority to enforce a stoppage of work.

This all unmistakably points to the conclusion that there is nothing the owners can do short of complying with the full demands of the Miners' Federation in order to give satisfaction and avert further trouble. In these trade disputes, there is clearly in these times strengthened resolve on the part of the men's representatives to constitute themselves sole arbiters of what shall be when fresh demands are preferred. We had this emphasized in the tramway dispute in London over the claim for an additional 8s. wages. The London tramways, with omnibus and tube competition, are not in a flourishing state; but the owners offered 5s. increase, and the submission of the balance of 3s. to arbitration. If the 8s. was a fair sum, and the tramway men had an unassailable case, they ought to have had no fear as to submitting the 3s. to arbitration; but their leaders declined, and would not budge for a time from the 8s. Again the Government intervened, and there were further negotiations, which resulted in a new offer, providing for an increase to the uniformed staff of 6s. on the basic wage, and no change in the bonus wage until the cost of living has dropped eight points below the index figure of 75. The other grades are to have 4s. on the bonus wage, and no change in the bonus until the cost of living has dropped eight points below 75. The terms were accepted by the men on Monday; and the strike ended. We refer to this as, considered in relation to the attitude of the miners' leaders, it indicates a tendency to yield to no one upon the wage claims of the unions, no matter how arbitrarily fixed,

no matter how impossible it is for an industry to bear the additional charge without inflicting injury upon itself.

Another serious point is the callous inconsideration of the union leaders for the public. Manifestly in their eyes the public have no right to consideration. The greater the torture they can inflict upon them, by the collaboration of unions, the more certain, in their opinion, are they of securing their ends, whether or not justified. In this tram strike, the bus men came out in sympathy; the leaders gave notice to the tube men to be ready to quit their work on Friday night if a settlement had not been achieved; and then the public were told that the next line of reserve to be called out would be the drivers of the surface electric trains serving London. The piling of trouble upon the public is trade union policy and tyranny to-day. The sane and constitutional method of reference to a competent tribunal is not acceptable to them. Nor is it for them to consider whence the money is to come. They have only to prefer; the owners to obey. Those who ask are to be the sole arbiters in the matter; and all the force which can be marshalled is to be used to compel. The London public bore the inconvenience of last week with a fine stoical indifference. The workers in London—old, young, and middle-aged alike—had in many thousands of cases to tramp a long distance from and to their homes, while the tram and bus men stayed at home or loitered idly about the streets. Upon the workers the union leaders were prepared to inflict greater punishment through the instrumentality of the tubes and surface electric trains. Those leaders prefer the application of the bludgeon to the public head rather than submit the grievances of the men to arbitration. And this we learn is only the beginning. The present agreement is merely, as it were, an interim one. The balance of the demand is to be sought on some future occasion. We fear that this settlement will have a very bad effect in other industries. Already there are fresh applications from other quarters on the table; and there are rumours of more coming forward. In the building, engineering, shipbuilding, and other industries trouble is gathering; and there is as we write an uncomfortable movement among the building operatives at Wembley, which may hold-up the preparations for the opening of the great exhibition. Incidentally, there is little probability that a Government so exposed to pressure as is this one from the trade unions will feel at all happy over the introduction of a Bill by Lord Askwith, which proposes to prohibit under heavy penalties a strike or lock-out where the dispute concerned has been referred to a court of inquiry under the Industrial Courts Act—this applying to thirty days only from the reference, unless there is mutual agreement to an extension of time.

At the moment it looks as though the miners may be the next to do their part in imposing injury on the country, unless, of course, the Government can stave-off an actual stoppage by introducing a Minimum Wage Bill and holding an inquiry (as they are requested to do by the Miners' Federation) into the wage question and the economic position of the mining industry. The former would in all probability be disastrous to themselves; and the latter is fraught with difficulty of a no mean order. It is the considerable variation in the economic position of the industry in the different areas that is the chief difficulty of the owners in dealing with the wages question on a national basis. Meanwhile, the scramble for coal goes on. Reports from the different areas inform us that the pressure for coal by gas undertakings is generally very strong in view of possible trouble. In some districts deliveries under contracts are much in arrear; and there is little gas coal to be had on the open market. What does find its way there, is quickly snapped up. The National Gas Council have called the attention of the Mining Association to the serious arrears that exist in the delivery of coal under contract. Altogether, so far as coal is concerned, the outlook at the moment is distinctly gloomy.

Regulation of Road Works.

A formidable opposition is being developed to the London Traffic Bill which the Government have introduced, and which was read a second time on Friday, to make provision for the control and better regulation of traffic in and around London. The statement in the measure as to its intentions would have been more comprehensive and apposite had it included mention of the fact that a considerable part of the scheme is to control and regulate the road operations of local authorities and of public utility concerns using the subsoil of roads for their distribution plant. We are confident that not only will there be a large amount of opposition to the measure as it now stands, from the political and municipal standpoints, but that public utility undertakings in the extensive area affected will be found in combination against the limitations of their activities in the public service which the Bill proposes, or at any rate seeking some far-reaching amendments. The measure contemplates the constitution of an Advisory Committee (having powers to hold public inquiries) for the purpose of giving advice and assistance to the Minister of Transport, who will refer to them such matters as he thinks proper, which have relation to the London traffic area. The local authorities and public utility concerns involved are numerous, as is seen by a reference to the area as defined by the first schedule to the Bill. It includes the administrative County of London, the County of Middlesex, the County Boroughs of Croydon, East Ham, and West Ham, and defined parts of the counties of Berks, Buckingham, Essex, Hertford, Kent, and Surrey. The area we believe extends twenty-five miles around London; and some 141 local authorities are involved.

Clauses 4 and 5 are the ones that will have particular concern for undertakings whose operations necessitate the opening of the roadways. These contain far-reaching proposals, and of a character which will, if passed into law, impose upon such undertakings important time limitations and obligations as to obtaining road-opening authorization. It is, of course, only right and proper that work shall be arranged so as to mitigate as far as possible during its execution the congestion of traffic; and we are afraid that the experiences in London have shown that hitherto this has not uniformly been the case. Whether or not the proposals in the Bill will tend to such mitigation, is a matter that can only be proved by experiment. It cannot always be possible to determine months ahead the road repairing or reconstruction work that it is necessary to carry out. However, the designers of the Bill contemplate that it shall be the duty of every road authority within the area to submit to the Minister of Transport, on or before such half-yearly dates in each year as he may fix, a statement of all works of road maintenance and improvement proposed to be commenced and carried out by the authority during the periods of six months, commencing at the expiration of such interval (not being less than two months) after the half-yearly dates as the Minister may fix—being works of such a nature as will involve the closing to vehicular traffic of any part of any street, either absolutely or to the extent of one-third or more of its work. The statements are to be submitted by the Minister to the Advisory Committee for report. After considering their report, the next step is for the Minister to draw up schemes prescribing the times during which the works are to be commenced, and the order in which they are to be executed, or prohibiting or restricting the execution of the works. This power of veto will not be very palatable to the local authorities. Then after the lapse of fourteen days, if there is no objection, or objection has been withdrawn, the Minister may by Order confirm the scheme; otherwise he may, after considering objections, either by Order confirm the scheme, with or without amendments, or revoke it. We can appreciate that this routine and this central supervision and rule will be regarded as anything but convenient by those responsible for the upkeep of roads in their respective administrative areas; and it may be that so much bureaucratic control will not, after all, be in the interests of time-economy.

In this connection public utility undertakings having statutory powers to open streets for the purposes of their concerns may find the obligations and restrictions that it is sought to impose will somewhat conflict with the ordering of their work so as to contribute to the best interests of their service to the public. At the same time, the proposals may be advantageous in supplying opportunity for examining, repairing, or enlarging the part of their distribution system in the roadways in question during the period in which the local authorities are carrying out road repairs. The Bill proposes to secure this, by enacting that the Minister shall send to all statutory undertakings concerned copies of the proposals of the road authorities. This will be a convenience; but the clause does not say anything as to the length of notice of such road work that the statutory undertakings are to receive; and, of course, they cannot start overhauling parts of their distribution systems without time adequate to the making of preparations for so doing.

Furthermore, if all the statutory concerns with interests in the subsoil of a road proceed with work on their systems at the same time, we can foresee muddle. On the other hand, if they are allowed to work one after the other, the period of road surface and traffic disturbance will be prolonged. Still, if the Bill as it at present stands becomes law, the inconvenience will in cases have to be borne, inasmuch as it will not be lawful for any undertakers within twelve months' completion of the road work to break-up the street, unless they can prove to the satisfaction of the Minister that the works for the execution of which they require to open the street could not reasonably have been done while the road work was in hand, and that it is essential that they should be carried out within the twelve months. We are afraid that these contemplated enactments, however judicious they may be in the long run, will not tend to the expeditious performance of road work; and the longer the delay occasioned, the greater may be the cost to the road authorities. Another point is that it is inconceivable that a public utility concern would propose breaking-up a street unless the works were imperatively necessary; and what the administrations of the concern may consider imperatively necessary may be prohibited by a Minister himself without qualification for determining the matter, but advised by a Committee upon which the public utility concerns, be it noted, are not given representation. We are fairly confident that efforts will be made severely to amend this part of the clause. There is a further sub-section, which shows that expediency has not been altogether overlooked in drafting the measure. It provides that "nothing in this section shall prevent any road authority, or any such undertakers as aforesaid, from carrying out works in any streets in cases of emergency, or prevent any such undertakers from making, altering, or repairing service connections." Had this provision not been made, and had the Bill become law, there would have been a positive stoppage, or at all events delay, in effecting business requiring new service-connections during the prohibited period. As it is, the main clause materially interferes with the existing statutory liberties of public utility undertakings. A further section deals with unreasonable obstructions in the performance of road work, and their mitigation.

If the Bill becomes law, it is proposed that it shall come into operation on Oct. 1; but we anticipate that before then it will be in Committee the centre of a great deal of controversy, and, if not rejected, will undergo considerable modification.

Testing Appeals.

It is understood that some of the gas undertakings which have had occasion to lodge appeals in respect of adverse reports by gas examiners have not followed the rules applying to the matter, as set forth in the "Journal" for Nov. 1, 1922 (p. 319). They have not addressed them to the Chief Gas Examiner, Board of Trade, London, S.W.1; and some of them have not lodged the appeals within seven days of the receipt of the report. If the conditions are not properly observed, the appeal may be jeopardized. It is essential that there should be strict compliance.

Modernizing Old Cookers.

One of the problems of the times is the modernizing of old gas-cookers, so as to give the users the advantage of the higher efficiency of the new types. In a highly practical paper read last Wednesday by Mr. Herbert C. Higgs, of Basingstoke, before the Eastern District meeting of the Southern Association of Gas Managers, he describes how he relines gas-ovens, and equips them with a new hotplate fitted with the latest types of grill and adjustable burners, all of which parts can now be purchased from the makers. Illustrations are given in the paper showing old types of ovens converted to a new state. The cost of doing this is modest. Under the existing order of things, this is work which will have to receive increasing attention.

Mains of Insufficient Capacity.

It is gathered that the clause dealing with this matter is still the subject of discussion between the National Gas Council and the Railway Companies. The two parties are still trying to find a mutually acceptable form of wording. Meantime, it would be well if opportunities for further opposition were avoided until the question is settled. This could be done by the deletion of the existing clause from draft Orders that are about due for confirmation by Parliament, or a suspension of the progress of draft Orders until agreement has been realized. This suggestion need not apply to Special Orders for which application is contemplated or about to be made. By the time such Orders are well on their way, an agreed clause should be in existence which could be substituted for the original one—at any rate, the National Gas Council are hopeful of a successful issue to the negotiations.

Catering at Wembley.

As is well known, Messrs. Lyons are largely going to rely upon gas for their immense catering enterprise at the British Empire Exhibition. They must have something reliable, economical, efficient, and with a large thermal range of application for the many and varied things to be cooked or heated. Therefore they chose gas; and it is estimated that they will require about 2 million c.ft. per week.

Standard Cookers.

Agreements have been entered into between the National Gas Council, the Parkinson Stove Company, Ltd., and Messrs. R. & A. Main, Ltd., for the manufacture and sale of "National" gas cookers. It is understood that each agreement contains a clause under which the firms have consented to sell the cookers at prices not exceeding those fixed.

Labour and Smoke.

The present Labour Government have a fine opportunity to show that they are prepared to do something constructive in improving the sanitary conditions of the air in our towns. It is understood that they are very solicitous about saving the labour of the housewife; and one way in which they could do this is to deal in a rational way with the pollution of the air by smoke, by suppressing as far as is possible the use of labour and dirt creating coal. According to Lord Newton, who is the chief apostle of smoke abatement in the ranks of our prominent legislators, previous Governments have only fooled with the question. But there is no doubt, from what his Lordship said at the meeting of the Coal Smoke Abatement Society last week, that pressure is going to be brought upon the Government to bring in a Bill which will do something (if not much) to remove this national disgrace. Lord Newton is the new President of the Society; and he will have good backers in Parliament in Mr. Percy Alden and Sir Arthur Holbrook, Bart., both of whom are users of gas cookers and fires. The Minister of Health, we are afraid, is going to have a most unpleasant time, if he fails to do something genuine in this direction. Already Mr. Wheatley has pleaded that the hands of the Government are so full that they are not likely to introduce a Bill of their own, and a private member's Bill would stand little chance. Yet this is a matter affecting the health of the people, the preservation of property, and the saving of labour and money. It is therefore a national question—one that is more important than many others that occupy time at Westminster.

Summer Time.

In accordance with the Summer Time Act, 1922, the period of summer time in this country will begin this year at two o'clock on the morning of Sunday, April 13.

Research and its Instruments.

Research is a growing factor in our national work of making advance. The National Physical Laboratory is going to show the public at the British Empire Exhibition some of the wonders of the instruments by which scientific testing and measuring are carried out. The display will cover some 1500 sq. ft. of floor space; and it will have in it a vast amount of interest. Among much else, it will illustrate the necessity for accuracy in engineering practice, and how that accuracy is attained to an enhanced degree. Gauges used in the workshop, together with measuring machines and apparatus for testing them, will be exhibited, with still more precise instruments for verifying the accuracy of the latter. This sequence of degrees of fineness will be continued until practical infinity is reached in special types of comparators which are capable of detecting a difference in length of a millionth part of an inch. These wonderful machines have all been de-

signed, and the majority constructed, by the N.P.L. The Engineering Department presents machines for testing the strength and efficiency of chains, gears, and bearings, and a Wöhler fatigue testing machine will be shown, which, aided by its small mirror, indicates when a metal has reached the limit of its endurance. Investigatory methods will be described, and typical failures shown in the Metallurgy Department. Altogether the exhibit of the National Physical Laboratory will be a wonder-provoking demonstration of the amount of research and mathematical precision which lies behind the finished products of the British engineering industry, and which is, to a large extent, responsible for the reputation our manufacturers enjoy for the inherent quality of their goods.

PERSONAL.

Mr. JOHN F. COLQUHOUN, assistant to Mr. S. B. Langlands, Inspector of Lighting, Glasgow, has been appointed Lighting Engineer for Sheffield, and will begin his duties there on May 1. He will be the first occupant of the position, the street lighting of Sheffield having been under the superintendence of the Chief Constable up to the present time. The salary attached to the position is £500 per annum. Mr. Colquhoun was unanimously recommended from among a number of candidates. He was founder, and is a Past-President, of the Glasgow Lighting Association. He is a member of the newly-formed Institution of Public Lighting Engineers and Superintendents.

Mr. G. E. FOXWELL, M.Sc., of Sheffield, Chief Chemist to the Koppers Company, has been appointed Chief Assistant Research Chemist to the Gas Light and Coke Company. Mr. Foxwell is well-known in the bye-product coking industry. In March, 1923, he was awarded the 1916 Bronze Medal of the International Metallurgical and Chemical Society, for his mathematics, physical theory of the path of travel of the gases in the coke-oven, and his work on ammonia.

Mr. ARTHUR FORSHAW, who since June last has been engaged in research on Gas-Oven Testing for the Institution of Gas Engineers, has accepted the post of Chief Chemist to Messrs. R. & A. Main, Ltd. In recognition of the importance of this work, the firm has agreed to allow Mr. Forshaw, before taking up his duties, a limited period of time in which to endeavour to bring the research to some conclusion.

Mr. L. J. WARREN, late Manager and representative of Messrs. George Wilson Gas-Meters, Ltd., has joined the firm of Messrs. A. G. Sutherland, Ltd., Birmingham, as their representative in the North of England.

Mr. HENRY STEVENSON has been appointed Northern Representative for Messrs. George Wilson Gas-Meters, Ltd. Mr. Stevenson is well known to North of England gas engineers, and has for several years represented Messrs. James Milne & Son, Limited, on this ground.

Mr. PERCY G. SOMERVILLE, of the National Benzole Association, has been elected a member of the Society of Chemical Industry.

OBITUARY.

DEATH OF MR. ARTHUR F. PHILLIPS, M.Inst.C.E.

It is with profound sorrow that we receive the news, as we are about to send the "JOURNAL" to press, of the death on Monday evening of our old friend Mr. ARTHUR F. PHILLIPS. He had been ill for some ten days, and was unconscious during the 48 hours preceding his death. Time will not permit of an account being given in this issue of his long connection with, and the prominent part he has taken in the affairs of, the gas industry. Highly practical in his professional work, always possessing great honesty of purpose, courteous to all men, he was beloved and trusted. He passes greatly honoured. There will be many mourners at St. Albans Abbey at 2.15 on Friday; and no doubt many friends will be travelling, to pay their personal tribute to a life well spent, by the one o'clock train from St. Pancras to St. Albans, where carriages will be waiting.

It is with sincere sorrow that we have to record the death, through a motor accident on the 21st ult., of Mr. HAROLD GEORGE EVESON, who was so highly popular among gas men. Mr. Eveson, who was 50 years of age, was the eldest son of Mr. G. J. Eveson, and was a Director of the Eveson Coal and Coke Company and of the Staffordshire Tube Company. Prominent in Masonic circles, he was one of the founders and a Past Master of the Murdoch Lodge. The accident occurred while Mr. Eveson was motoring from business. His car came into collision with a motor lorry, and as a result Mr. Eveson received injuries to the head. On being taken to Selly Oak Hospital he was found to be dead.

Mr. JAMES PHILLIPS, who died last Wednesday at the age of 82, was a well-known public man in Minehead, but it was as Chairman of the Gas Company that he rendered most notable service to the town. He became a Director of the Company in 1891, and six years later was elected Chairman.

ELECTRICITY SUPPLY MEMORANDA.

NON-TECHNICAL legislators get into their heads most extraordinary ideas; and if legislation involving technical questions were left entirely to them, the country would slip into an awful muddle, and would speedily be on the road to financial ruin. Much blame for this sort of thing, so far as electricity supply is concerned, attaches to those committees on electric power supply who sat when the reconstruction fever had strong hold of the then Government. According to those committees, the carrying out of their plans for reorganizing the electricity supply of the country would create a new heaven upon earth. Electricity was to be supplied at a price which would enable the labourer in his cottage to have it for lighting, cooking, heating, and even for knife-cleaning and other domestic purposes, and millions of tons of coal per annum were to be saved to the country. A bigger piece of fiction was never issued by a Government Department. But it gained some hold over many non-technical legislators, among whom is Major Lloyd George. He gave excellent evidence of this, and of his lack of knowledge of the subject, during a recent debate on the estimates of the Ministry of Labour. He deplored the absence of mention of schemes for the improvement of the electrical resources of the country. In his view there are certain essentials to enable us to win the race in industrial supremacy; and he gave expression to two accepted platitudes. One is that to do this the costs of production must be brought down; and the other is that the way to bring them down is to increase output. We take it his object in mentioning this matter in connection with the Ministry of Labour was to help employment. This being so, some people will agree, others will not, with two other platitudes which he voiced. They were: To increase output the most efficient method is to place more machinery at the disposal of our workpeople; and to provide as cheaply as possible the motive power for that machinery. But there are very many workpeople who would disagree most heartily with the theories of Major Lloyd George; their view being, though we do not agree with them, that machinery creates unemployment. But then the Major went on to say that electricity is the most efficient motive power that is known. Of course, there he got out of his depth. If he had adhered to economic commonplaces, all would have been well; but he stepped into a strange place, and lost himself. Any disinterested engineer would tell the Major that there is no one form of motive power that is best for all circumstances. One form may be more convenient, and even more economical, under certain conditions than any other; but another form would be more economical in other circumstances. Therefore, electricity is not the "most efficient motive power that is known." It is the most efficient when the circumstances are favourable; it is not the most efficient when conditions are more favourable to a competing form of power.

A Legislator's Platitudes

With one of the statements of Major Lloyd George there is cordial agreement. There is an enormous wastage in the generation of electricity in this country. But with the reasons he gave for the wastage, we need not agree. He said it was due to the large number of authorities and the systems employed. That again is only partially true, because there are little stations that show as high an efficiency in generation as several of the large ones; and the advocates of super-power stations frown heavily upon the audacity of the small stations which dare to show an excellent generating efficiency. Such stations are admittedly in the minority; but what they do, others could do, given the same types of plant, supervision, and opportunity. The greatest waste, the Major asserted, is in fuel consumption. Fuel consumption is a comparatively small item in the total costs of electricity supply. Capital charges and distribution expenses together overwhelm generation costs We should not like to-day to confirm Major Lloyd George in his categorical statement that the amount of coal consumed in electricity stations is capable of generating three times as much electricity as is now produced. In some stations it is true; but not in the large and efficiently managed ones where the greater part of the coal is used. However, to get rid of the more or less inefficient stations would mean the scrapping of a lot of plant, for which the electricity consumers would have to pay. Another thing is that electricity is not produced by coal alone; and to generate three times the present quantity of current would necessitate much plant—generating and distributing—for which a goodly sum of money would have to be found. It is an absurd fallacy to suppose that cheapness with electricity is all a question of fuel, seeing that this is only a relatively small element in the total costs. Then there is another fallacy. There is, Major Lloyd George says, a large amount of coal which would not stand transportation, but which could be used for the generation of electricity at the pithead. Poor coal in boiler work means the lowering of the efficiency of the plant, and it involves more labour To reduce the evaporative duty of the boilers by the use of poor fuel, simply means that more boiler capacity is required, more capital expenditure is involved, more fuel has to be handled, and a larger quantity of ashes has to be dealt with, to raise a given amount of steam. This heavily discounts the gain from the use of a poor fuel costing less per ton and giving

And Fallacies.

less evaporative power. In addition, the distribution of the electricity from the pithead would cost much more than the distribution of current from stations situated in the locality of use—the difference probably more than wiping out the cost of the conveyance of better-class coal to local generating stations. We should strongly advise Major Lloyd George to keep clear of those things of which obviously he knows little or nothing. In fact, this was suggested to him during the debate. He was twitted by Mr. Hopkinson, on thinking that it is only necessary to make power stations big enough to be able to sell electrical energy to the consumer at a very low rate. This, of course, is a complete fallacy. And as Mr. Hopkinson says, the difference in cost to the consumer between electrical energy produced at a 500,000-kw. station and that generated at a 10,000-kw. station is only a fraction of a penny. The real or heavier costs are found in other directions. Mr. Gosling, the Minister of Transport, supplied information showing that the Electricity Commissioners have been busy in distributing grants for loans for electrical purposes, which is regarded as a good sign of the development of the industry, which in turn is stimulating employment. Judging from the complaints of slackness in the factories of manufacturers of electrical plant, a high standard of employment is not universal throughout the industry.

Should the State Investigate Failures?

We can well understand that electricity supply undertakings are not desirous of more publicity than is unavoidable regarding the failures of supply. The capacity for fault-creation of electricity generating plants, distribution systems, and electrical apparatus is beyond description. However, Mr. C. W. Marshall recently read a paper before the Glasgow Corporation Electricity Department Engineering Society—a "Review of Interruptions." But we have only seen a paragraph alluding to the paper. Perhaps the reason for the absence of a full account of it is found in the statement that the natural tendency of supply authorities to keep the numbers and details of their breakdowns to themselves prevents the publication of any general statistics relating to the degree of continuity maintained on the various electricity networks of the country. There is no need for astonishment at the "natural tendency;" seeing that no one knows better than the electricity suppliers that a reputation for unreliability does them no good in respect of business development, and they get a full concentration of worry from all their customers who are the sufferers. But failures and faults are far from being sought by electricity suppliers; if they could avoid them, they would not occur. The truth is that even the best regulated of systems suffers disturbances in respect of continuity. This being so, we do not think those responsible for the conduct of electricity supply concerns will altogether endorse the opinion of Mr. Marshall, that the need for continuity is so important that it seems to be inevitable that sooner or later the State will be forced to make searching inquiry into every failure which occurs in electricity undertakings, in the same way as is at present done in connection with railway and mining accidents. This is an admission that things are rather bad in connection with interruptions of electricity supply and service, and the importance of the effects occasioned. Another indication of the seriousness of the position is found in the fact that Mr. Marshall was able to discuss, under the following heads, the troubles on the Glasgow system during the year ended Feb. 29 last: (1) General statistics with notes on important faults which occurred in the period under consideration; (2) division of faults among the different pieces of apparatus which gave rise to trouble; (3) steps which are being taken to improve the safety of the system. It would have been interesting to have further details respecting these matters. It is only when general failures occur that information is published concerning them. The considerable number that take place on consumers' premises is known only to themselves and friends to whom they choose to unbosom themselves as to the annoyance of electrical inconstancy.

Public Opinion and Spendthrifts.

In the "Electrical Trader" supplement to "Electrical Industries," there is a note to the effect that the manufacturers of cooking and heating appliances "practically all" state that they are working at full pressure to cope with the orders that are coming in. Some of them will rub their eyes over this statement; but if they have regard for the truth, they will be thankful to find that the writer inserted the words "practically all;" for this will show that he has at all events excluded those who may object. The same writer says that public opinion is now growing strongly in favour of the electrical idea for cooking and heating, and that "the people who look with amazement at an electric oven or ask if you can cook with electricity are now non-existent, or practically so." This excellent and careful observer of the attitude of the public seems to have missed a great deal. What amazes the public is the audacity of some of the suppliers of electricity in talking of the economy of electricity for heating and cooking—"economy" which in the eyes of the public starts at the wiring and the installation of the apparatus, on to the running cost and maintenance, and the economy of time in boiling operations. The writer adds that a month ago several cases were recorded of hospitals and other institutions that were "considering" electric cooking. Since then he has learned that another hospital has decided to have electric cooking throughout the kitchens and the wards. There are, of course, many spendthrifts in the world; and among them are some local authorities, with electricity supply undertakings and public institutions under their control. The one serves well as the customer of the other; the public pay, and not the members of the local authority.

Competition of the Wiring Man.

The difficulties before the electrical contractors' registration scheme are many, are recognized, and are lamented. There is an earnest desire to get to a healthier standard in electrical wiring, and incidentally to make a fair profit on it. It seems that, in the wiring of houses and shops, there is (according to the "Electrician") a growing competition from individuals with little or no qualification for the work. This is the sort of thing that cannot be stopped. The householder and the shopkeeper would strongly resent any interference with their freedom in placing their orders where they please, and in such cases the householder and tradesman consult no one, and take nobody's advice. It is asserted that a very large amount of work is now going to single-handed journeymen, who do the work themselves, and value their labour at about 10d. or 1s. an hour. This makes competition difficult. Many of these are ex-service men (with a pension of from 21s. to 30s. a week), who while in the army picked up a certain amount of knowledge of electric wiring. All they seem to seek is the making of (say) from £2 to £2 10s. per week, *plus* the cost of material. It is thought that, unless some pressure can be brought to bear upon the wholesale houses and factors to stop supplying these men, there is little hope of an improvement in this direction. But how can there be interference in this way with the business of the wholesaler or factor? They would resent it; and the manufacturers prefer having them as friends rather than enemies. The complaint regarding this competition of the individual with established contractors seems to be pretty general; but it would appear from the published statements that the individual electrical wirer is possessed of great activity, and must be somewhat popular, or his presence would not be so noticeable by the ordinary contractors, and so awkward an obstacle to their prosperity.

Jerry Work at Morecambe.

Complaint has been made of the wiring in many of the electricity consumers' houses in Morecambe. The Borough Electrical Engineer (Mr. Joseph Boyce) is the aggrieved one. This is what he says; "There are about thirty-six people or firms in Morecambe professing to be electrical contractors, and unfortunately a large number of these carry out work which is not satisfactory, with the result that there is a lot of jerry work in Morecambe. This is in the interest neither of the consumers themselves nor of the Corporation. Most of the electrical contractors in Morecambe make the foolish mistake of cutting their prices to such ridiculous and impossible figures that they cannot make a good job without losing money. Therefore, rather than lose money they scamp the job. It is a very bad policy, which does not pay in the long run."

Equipment and Charges in Small Houses.

The Gateshead Town Council have adopted a recommendation by the Housing Committee to the effect that an offer by the County of Durham Electrical Power Distribution Company be accepted for the electrical equipment of 104 houses to be erected on the Carr Hill Estate; it being understood that the Council are to be under no obligation to extend the electrical installation to any further houses which they may build thereon. Thus the tenants of the 104 houses will have to use electricity, whether or not they wish to do so. The method of charging proposed by the Company is as follows: Five-roomed house, fixed charge of 4s. 6d. per month and 1d. per unit up to 2040 units per annum, and ¾d. per unit for all over 2040 units per annum. Four-roomed house, fixed charge of 4s. per month; and three-roomed houses, 3s. 6d. per month, other charges being the same as for five-roomed dwellings. The electrical apparatus in each house will include "a washer and boiler, radiators, fires, and cooking stoves." It was stated at the Council meeting that electricity will be as cheap as gas in the long run. The tenants will later on be able to judge of the truth of the assertion, if they apply electricity to the same range of purposes as is usually the case with gas.

The Lancashire Salesmen's Circle.—The Manchester Section, Lancashire District, of the British Commercial Gas Salesmen's Circle, made a new departure in their ordinary routine last week by having a social and musical evening at the Mitre Hotel, Manchester, on Tuesday night, under the presidency of Mr. J. H. Sillitoe (Chairman of the Circle). The gathering was a real success. Mr. I. Humphries (Salford), in proposing, and Mr. J. H. Massey (Oldham), in seconding, a vote of thanks to the entertainers, expressed the wish that the meeting would prove but the beginning of many more similarly pleasant gatherings—a hope which was enthusiastically endorsed by all present. The entertaining members were Mr. E. Brown (Manchester), Mr. T. P. Wilson (Runcorn), Mr. E. Dexter (Preston), Mr. P. H. Christian (Southport), Mr. S. Collins (Manchester), Mr. A. H. Williams (Chester), and Mr. J. Robinson (Altrincham). In the course of a short speech, the Chairman said the Circle had been remarkably successful. All their meetings had been well attended, never less than a hundred being present.

INAUGURATION OF EXPERIMENTAL COAL-GAS PLANT AT LEEDS UNIVERSITY.

In Memory of the Late Sir Corbet Woodall.

LAST Wednesday the experimental coal-gas plant presented by Mr. Henry Woodall, in memory of his father, the late Sir Corbet Woodall, D.Sc., was officially opened. The total cost of the plant (which has been handsomely contributed to by others, as will be seen by the report of Mr. Woodall's speech) was nearly £4000. It is not merely a small-scale reproduction of a gas-works, but, as Prof. J. W. Cobb explained, has been designed to secure the elasticity in working and the precision which are necessary for the prosecution of investigation. Its potentialities for valuable research are very great; and the gas industry anticipates with interest the results of the experiments to be carried-out under the able guidance of the Livesey Professor.

Last Wednesday's function at the University of Leeds, and the universal thought regarding its object, are proof not only of the advancement of, and the fuller realization of responsibility in, the gas industry, but of the general resolve to progress further in the science and practice of coal utilization. The opening of the new plant may well be regarded as a signpost indicating the path towards greater knowledge of a subject of vital importance to the nation, pointing the way to higher efficiencies of, and consequent economies in, coal carbonization. It is hoped shortly to commence a study of stage carbonization on a working scale on the lines of the laboratory work carried out by Burgess and Wheeler; and there can be no doubt of the value of the data which will result, for the investigators will bring to bear on the work the accumulated experience of past researches which have proved of such immense worth to the gas industry.

The opening ceremony was preceded by a luncheon, given by Alderman Charles Tetley, M.A., LL.D., in the University Refectory. Among those present may be mentioned the Pro-Chancellor of the University (Mr. E. George Arnold), and the Pro-Vice-Chancellor, Mr. Henry Woodall, Junr., Mr. S. Tagg, M.Inst.C.E. (President of the Institution of Gas Engineers), Prof. J. W. Cobb, C.B.E., B.Sc., F.I.C., Alderman G. Ratcliffe (Chairman of the Leeds Gas Committee), Alderman G. Clark, J.P., Mr. W. Doig Gibb, O.B.E., M.Inst.C.E , Mr. S. Glover, Alderman Brookes, Mr. H. J. Hodsman, M.B.E., M.Sc., F.I.C., Dr. A. Parker, Dr. E. W. Smith, Dr. H. G. Colman, Messrs. F. B. Richards, J. F. Scott, J. W. Wood, M.Sc., A.I.C., Joseph Clayton, C. T. Bennett, J. W. Drake, and Colonel M. M. Bidder.

At the opening ceremony which followed, the Pro-Chancellor of the University presided, and was supported by Mr. Henry Woodall, Alderman Tetley, Mr. Samuel Tagg, and Prof. Cobb. The Duke of Devonshire, Chancellor of the University, had hoped to be present, but was detained in London owing to his duties in the House of Lords. Mr. Arnold, however, conveyed his appreciation of the gift.

Mr. HENRY WOODALL first of all thanked Alderman Tetley for his kindness in giving the luncheon. In handing over the gift, he said his task was a very pleasant one. All through he had had a most happy experience, because of the willingness, and more than willingness, of his own and his late father's friends to co-operate in making the plant as complete and useful as possible. It was a complete and unique plant for the work it had to do. It had been designed by Mr. Scott, with the help of Prof. Cobb and others; and the result, he had been told by the Professor, was a plant which he had long desired. The main advantage was that, while being a practical plant, it was of such dimensions that it could be worked entirely by the Professor and his assistants. It was designed so that at almost any point or time the temperatures and conditions could be ascertained, and all residuals collected. He hoped and believed that the results obtained through the working of the plant would enable the University to increase the debt the gas industry already owed to it. Dr. Carpenter, a distinguished member of the University, had spoken last month of a vista opening-up coal carbonization as a science, and he had shown what splendid results could be obtained when scientific and technical knowledge were combined with sound practical working. He trusted that, partly through the agency of the plant, many good men would be trained at Leeds who would later enter the gas profession, and thereby greatly improve gas practice throughout the Kingdom. The original idea of the erection of the plant was, he believed, due to Mr. W. T. Dunn, the Secretary of the Institution of Gas Engineers, who had suggested it to him. The suggestion then was to erect one setting of retorts only. This had been enlarged, and they now had two settings, one vertical and one horizontal plant. The cost had greatly exceeded the first rough estimate; but so many friends had expressed a desire to help, that it had been possible to erect the much larger plant, and then have something left for a small endowment. There were five Gas Companies with which his father had been specially connected: The Gas Light and Coke Company, the British Gas Light Company, the Tottenham District Light, Heat, and Power Company, the Bournemouth Gas and Water Company, and the Croydon Gas Company; and they had been most generous in their help. Messrs. Humphreys and Glasgow had offered a carburetted water-gas plant; but it had been found that the make of gas from the smallest practical plant would be more than they could deal with. However, Mr. A. G. Glasgow, an old and valued friend, had insisted on giving a handsome donation. Messrs. Clayton and Co., Ltd., of Leeds, who had built the gasholders, purifiers, &c, had given a handsome gift in money, and had also supplied the apparatus on most advantageous terms. The Woodall-Duckham Company had presented a setting of vertical retorts free. Messrs. Gibbons, Bros., Ltd., had given a horizontal setting free; and Messrs. W. Parkinson and Co. were responsible for the gift of a meter. He thanked all these friends for their generous help. Many others would have been willing to do the same, had they been approached, for his father had been as highly esteemed by those who worked for him as by those for whom he worked. He hoped his friends would not think him wanting in appreciation of their great kindness and generosity because of his somewhat scant acknowledgment; but words would not add to the sincerity of his feeling in the matter. He need hardly say how interested his father had been in the University, and how proud of the Degree it conferred upon him. It had been a pleasure to him to carry on that interest and to do what he could to introduce graduates into the gas industry. In asking them to take over the completely equipped gas-works for the use of the University, he might say how much he appreciated the opportunity it had given him of paying this small tribute to the memory of one who of all men he most loved and admired.

The PRO-CHANCELLOR, on behalf of the University, thanked Mr. Woodall and his associates most heartily for their generous gift, for which every one of them was grateful. The plant would be a great scientific asset to the University, and without doubt would facilitate research into gas problems.

Prof. COBB said he would like to add a few words of acknowledgment personally, and on behalf of the Department of Coal Gas and Fuel Industries which was so directly concerned and would receive, he was sure, so much benefit from the new apparatus for investigation and teaching placed in its hands. He might recall to their minds that the name of the late Sir Corbet Woodall had already been linked to the University and Department by a previous gift, which took the form of endowing a scholarship bearing his name—a scholarship to enable a promising young gas engineer to take the full degree course of the University. The connection had been more firmly rivetted by this further generous action of Mr. Henry Woodall, which was signalized in this ceremony. Moreover, the name of Sir Corbet Woodall remained one of such eminence in the gas industry, and stood for so much, that the connection of the University with it could be taken to symbolize a connection with the gas industry as a whole—a connection to which they attached the greatest importance and value, and one which, he was happy to say, seemed to be more firmly established every year. As regards the plant itself, he might repeat what he had said more than once before, that it was not merely a small-scale reproduction of a gas-works. It had been deliberately designed to secure the elasticity in working and the precision which were necessary for the prosecution of investigation—to do what could not, for different reasons, be done so effectively either in the laboratory or on the full working scale. This result, so far as it had been attained, had only been made possible by collaboration and careful consideration. The scheme as a whole, and the lay-out of the plant, owed much to the care and work expended on it by Mr. Scott, and to the help which had been rendered by their own Clerk of Works, Mr. Prince. He was speaking now of technical and personal assistance, which he had had special opportunities of appreciating, and which had so splendidly supplemented the financial help of donors, to which full reference had already been made. On the horizontal unit they had had the benefit of advice from Messrs. Gibbons. On the vertical retort section he himself had enjoyed the advantage of numerous consultations with Sir Arthur Duckham, Mr. Kent, and Dr. E. W. Smith, whose first services to the gas industry were rendered as Research Chemist in the Department of Coal Gas and Fuel Industries. Messrs. Clayton, and Messrs. Bryan Donkin, and indeed all concerned with the plant had given every possible assistance. And now the plant was installed; and it was for them to use it. He could only hope that the work which they did on it would be worthy of the generosity of Mr. Henry Woodall and all who had assisted them, and worthy of the great industry the problems of which they attempted in some measure to study and solve. Before concluding, he would like to thank particularly those who, no doubt at considerable inconvenience to themselves, had attended the ceremony from a distance; and in this connection he might mention specially the name of Mr. Tagg, the President of the Institution of Gas Engineers, and Chairman of the Gas Investigation Committee—that Committee of the Institution of Gas Engineers and the University which he thought could claim to have shown, by the results of its work, the advantages which might be attained by the co-operation of an industry and a university. He might say that investigation for this Committee would be commenced almost at once on the experimental plant in the immediate charge of Dr. Parker, of the Research Staff, and his assistants. No reference to the work of this Committee or of this Department of the University would be complete without the mention of the thanks they owed to Prof. Smithells, who had done so much in this, as in other matters, to give a real meaning to the term "applied science." They only regretted that he had not found it possible to be with them that day. Finally, he would add a word of thanks to Mr. Hodsman and Mr. Grist, for their work in preparing for the ceremony.

Mr. SAMUEL TAGG said they could not forget the example and public spirit of the late Sir Corbet Woodall, and they could have no more suitable form of memorial than one which, in association with the Leeds University, would afford a means of further scientific investigation. There never was a time when the industry was more desirous of guidance on problems of carbonization which must arise from the sale of gas on the thermal basis. This inherent desire for progress was drawing their attention to the solution of carbonization problems, so that they might conserve fuel resources and increase thermal yields in the form of gas. They looked primarily to Leeds for help in this direc-

tion. The progress which had already been achieved had served to make them more dependent on future work. The research already done had been fully appreciated; but a period had to elapse before the reports of the investigations could be absorbed. He suggested that some simpler interpretation of the researches, which could be understood more readily by the small undertakings, would be of value. The work of the University was receiving wider recognition; and he was sure that, with the additional facilities which the University had acquired that day, the industry would derive great benefit from future investigation.

Prof. Cobb then read the following letter, dated March 17, from Sir Arthur Duckham:

52, Grosvenor Gardens, S.W. 1.

Dear Prof. Cobb,

I am very sorry that I shall not be able to be at Leeds on March 26. I would have liked by my presence to have conveyed some small token of respect to my old friend and benefactor, Sir Corbet Woodall. His friendship meant much to me and assisted me when in the most difficult phases of the vertical-retort development. His example showed me the essentials of engineering and business conduct. I would further like to be present in order to demonstrate our great interest in the fine work you are doing at Leeds. Unfortunately, the shortness of notice has prevented my making re-arrangements for my London meeting.

I trust that you will have a good day. I am certain it will be enthusiastic.

(Signed) Arthur Duckham.

Alderman Tetley remarked that the completion of the experimental gas-plant was the realization of one of the many hopes that he had fostered during his long connection with the University and the Gas Committee of the City of Leeds. He was reminded of the words of Mr. Mundella, who, as he stood by the excavation made to receive the foundation stone of the Yorkshire College, said that he felt he was standing by the grave of Rule-of-Thumb. To-day they had placed one more weighty stone on the grave of this time-honoured ogre, for by the new plant they would obtain greater accuracy of thought, knowledge, and manipulation. Their duty as users of coal—the greatest of all Nature's gifts to these islands—was to conserve as far as possible the raw material; and investigation on the new plant would show them how to do this. Not only those who were present rejoiced in Mr. Woodall's noble gift, which formed a memorial to a man who was honoured throughout the gas industry and who appreciated to the full the part which science must play in this great industry. He now declared the plant open for inspection.

A tour of inspection was then made.

Description of the Experimental Gas-Plant.

In September, 1917, Mr. Henry Woodall made the generous offer to erect and hand-over to the University of Leeds an experimental coal-gas plant in memory of his father, the late Sir Corbet Woodall, D.Sc. This offer was gratefully accepted by the Council of the University, in November, 1917; but the conditions prevailing at that time prevented the carrying-out of the project. When circumstances became more favourable, Mr. Henry Woodall commenced operations; and the plant is now complete and ready for use. The scale of the scheme, and the fund connected therewith meanwhile has been extended by other donors who desired to be identified with Mr. Woodall in his work.

It stands on a site provided by the University, adjoining the Department of Coal Gas and Fuel Industries. Mr. J. F. Scott, Assoc.M.Inst.C.E., was the Engineeer in charge of the lay-out and construction of the plant, which is housed in buildings erected by Messrs. Banks Mawson, of Leeds. While the plant is arranged for the carbonization of coal, with recovery and measurement of the usual products, it is not merely a coal-gas plant of normal type on a small scale. It is designed to carbonize coal on a scale greater than is possible in laboratory apparatus, which is apt to yield some products in quantities too small to permit of measurement and examination. At the same time, the scale of operation is moderate, so that it will still be possible to maintain a uniformity of conditions and completeness of control usually impossible in plant of commercial size. It is thus hoped to make experiments on the carbonization process, but under conditions widely varying, if need be, from routine practice, and especially to study the effects of time, temperature, and atmosphere on the process. It is proposed to embark upon a programme of work at once; and it is hoped that the results will shed light on the mechanism of the carbonization process.

The plant is provided with both horizontal and vertical retorts; the former being housed in the main building, and the latter in an open yard behind.

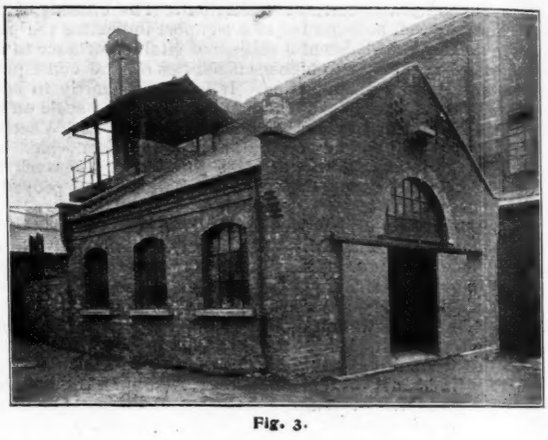


Fig. 3.

Fig. 3 is an illustration of the front of the plant. In the foreground is the horizontal retort house, and behind this are the vertical retorts, the exhauster house, &c. In the background the gasholder framework can be discerned.

The horizontal setting A, designed and erected by Messrs. Gibbons Bros., Ltd., of Dudley, contains two retorts of circular section, each taking charges of 2 cwt. These are heated by town-gas and compressed-air burners; the air being preheated by U shaped cast-iron pipes placed in the setting above the retorts. The burners are set in rows at each side of the retort; each gas and air tap being capable of independent adjustment. The retorts themselves have iron mouthpieces at each end, closed by the usual self-sealing doors. There are no ascension pipes or hydraulic mains, so that liquid products may be collected either in closed receivers placed below the mouthpieces, or along the

— Sectional Elevation —

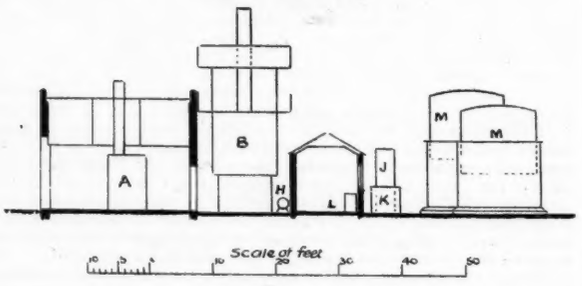


Fig. 1.

— Plan —

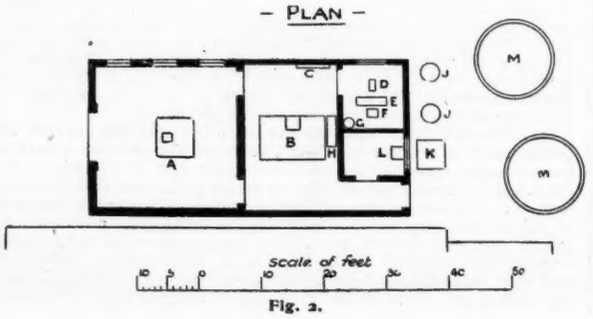


Fig. 2.

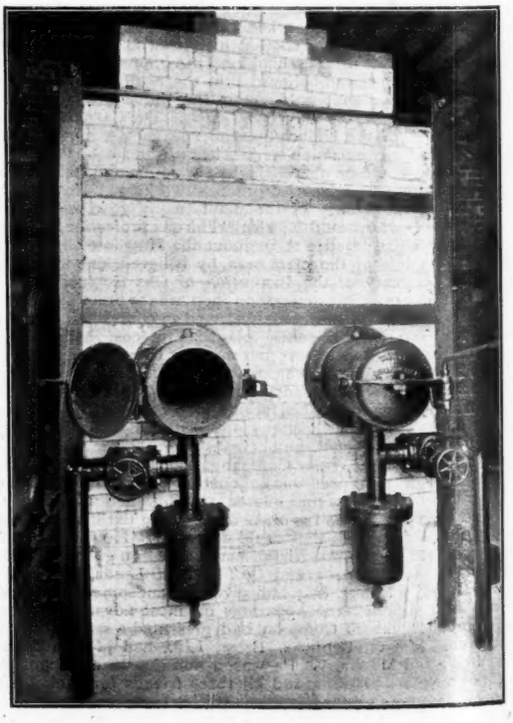


Fig. 4.

gas-mains which run below floor level. The reflux action of the ascension pipe will in this way be avoided. The retorts are connected at the back end of the setting. It will then be possible to run them singly, or in parallel, or in series, and in this way to study the secondary reactions consequent on bringing raw gas into contact with coke, firebrick, or any chosen material.

Fig. 4 is a front view of the horizontal unit. Of particular interest are the pots for collecting tar, &c., which are attached to the mouthpieces. The gas and air pipes are at the side of the setting.

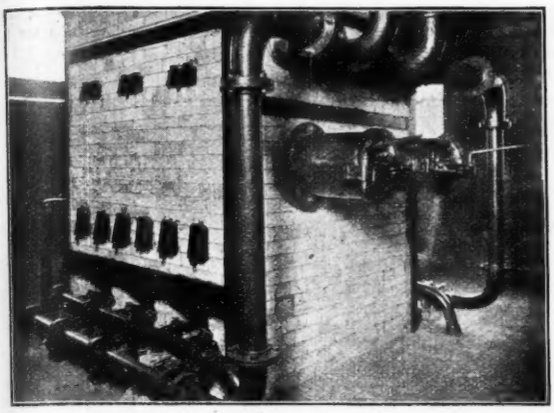


Fig. 5.

The back of the setting is shown in fig. 5. It will be noticed that a bridge-pipe connects the retort mouthpieces, and that the air preheating pipes are built into the setting above the retorts.

The vertical-retort setting B was designed and erected by Messrs. Woodall Duckham, Ltd., in the open yard behind the horizontal retort house. It contains two circular retorts of Meltham silica material, 9 ft. long, and 9 in. in diameter at the top, increasing to 1 ft. 3 in. at the bottom, where coke cooling chambers are attached, and means for coke extraction provided. The normal charge is 2 cwt. of coal, which can be fed in through hoppers at the top of the retorts. The coal will be raised by chain and blocks to the top platform, which is covered by a galvanized-iron roof. The heating will be effected by town-gas and compressed-air burners placed in the side of the setting, with independent taps so that the regulation of the temperatures can be effected at will, controlled from a lower platform. A certain recuperation of heat is achieved through the flue walls. The heating flues are arranged in six horizontal tiers encircling the retorts, each tier under separate control, to enable the temperatures to be varied throughout the 6-ft. heated length of the retort. The waste gases are collected in vertical flues which communicate with a brick chimney 16 ft. high. The crude gas passes downwards from the retorts, so that liquid products can be collected

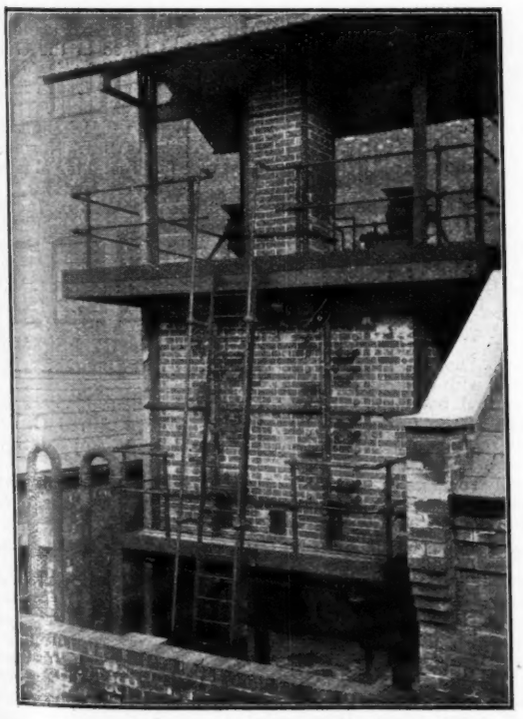


Fig 6.

without possibility of return to the retorts. Here, again, both retorts are connected so that each may be run singly, or both in series or parallel, as explained in connection with the horizontal-retort setting. Provision is made for experiments on steaming. Steam can be obtained from a small gas-fired boiler H supplied by Messrs. Spencer-Bonecourt, Ltd., of London. This boiler has seven firing tubes, and is rated to raise 122 lbs. of steam per hour at 200 lbs. pressure.

Fig. 6 depicts the vertical-retort unit, and shows the charging platform, the burner-control stage, and the pipes supplying gas and air to the setting.

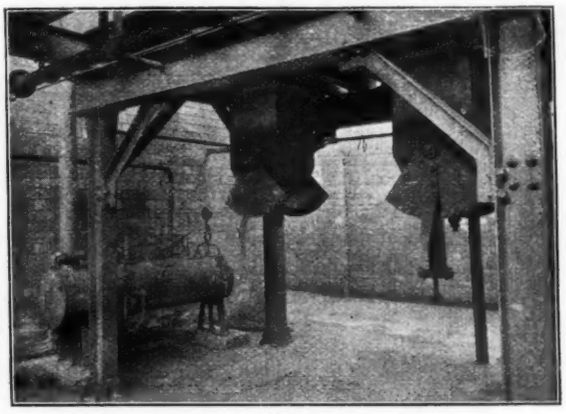


Fig. 7.

The discharge end of the retorts is illustrated in fig. 7, which also shows the gas-fired boiler.

The gas, whether from the horizontal or vertical retorts, will pass through vertical air-condensers C to the exhauster D supplied by Messrs. Bryan Donkin & Co., Ltd., of Chesterfield, which is housed in a small room behind the vertical-retort yard, with a compressor E supplying the air necessary to heat the retorts. Both are belt-driven from a shaft operated by a 5-H.P. motor E, and can be independently put in or out of gear by friction clutches.

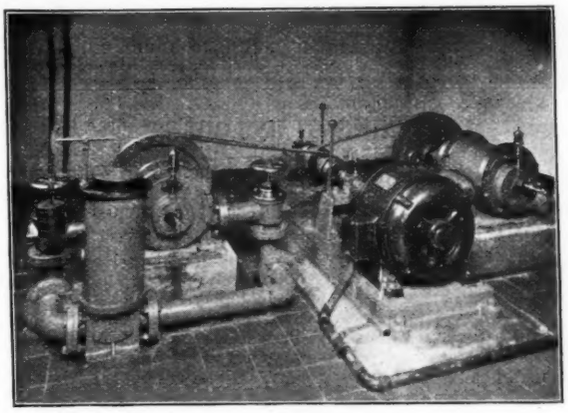


Fig. 8.

The interior of the exhauster house is illustrated in fig. 8. The exhauster is on the left of the photograph, and the air-compressor on the right.

After passing the exhauster, the gas is taken to two tower scrubbers J J provided with water sprays, which can be coupled in series or parallel. Both are packed with porcelain ring fillings supplied by Messrs. J. Macintyre & Co., of Burslem. After the scrubber comes an oxide purifier box K, and then a 100-light wet meter L provided by Messrs. Parkinson and Cowan, Ltd. The meter house which adjoins the exhauster house is fitted out as a sampling and test room, where the chemical work of plant control can be carried out. Samples of the gas can be taken here from taps connected to various points in the plant. After the meter, the gas can be led to the gasholders M M, two in number, each of 1000 c.ft. capacity, standing in steel tanks in the open space behind the plant. The holders were erected by Messrs. Clayton, Son, & Co., Ltd., of Leeds, who also supplied the condenser, scrubbers, and the pipework about the plant. By the holders stands a small house containing a meter provided by the Leeds Corporation Gas Department, where the fuel consumption of the plant can be measured.

From this description the importance of the plant to the gas industry, and its remarkable adaptability to widely varying conditions, will be realized. It marks an important stage in the development not only of the University of Leeds, but also in that of the gas industry.

SCOTTISH JUNIOR GAS ASSOCIATION.

Visit to the Gothic Works, Falkirk, of Messrs. R. & A. Main, Ltd.

About 200 members of the Eastern and Western Districts spent a pleasant and informative afternoon on Saturday, the 22nd ult., when, on the invitation of the Directors of Messrs. R. & A. Main, Ltd., they visited their works at Falkirk. To give the visitors an insight into the different processes in the manufacture of their specialities (gas cooking and heating appliances), the firm arranged for a few workmen to be in attendance in the respective departments; and under the guidance of the staff, the methods of production and finishing were explained and demonstrated. A striking feature was the display of appliances introduced since the last visit of the Association four years ago; and the progressive policy of Messrs. R. & A. Main, Ltd., was reflected in the fact that one of the new warehouses being erected was taxed to exhibit these. The visitors were greatly impressed by the additions to the works—erected or in course of construction—which add 40,000 sq. ft. to the firm's manufacturing facilities.

After tea, Mr. K. AIRD (Managing Director), in expressing the firm's delight at the large turn-out, remarked that visits of this nature were, in his opinion, beneficial both to the visitors and to the firm, for by the intercourse offered it was possible for the manufacturer to obtain at first hand the views of the user of gas-appliances.

THE MEMBERS OF THE SCOTTISH JUNIOR GAS ASSOCIATION AT THE GOTHIC WORKS, FALKIRK.

EVENING STAR LODGE.

Installation Festival.

The Evening Star Lodge (No. 1719) held their annual installation festival at Freemasons' Hall, Great Queen Street, London, last Wednesday, for the elevation to the chair of Bro. Rae Prinsep Normand, S.W., who, having successively passed through the various offices of the Lodge, was elected Worshipful Master at the last meeting. Members and visiting brethren assembled in the Grand Temple, where the ceremony was performed; the attendance being exceptionally numerous.

W. Bro. Frank West, the retiring Master, occupied the chair at the opening, and subsequently efficiently carried out the duties of Installing Master, in which he was ably assisted by Past-Masters, including W. Bros. Wm. A. Surridge, P.A.G.D.C., E. G. Smithard, P.P.G. Treas. (Norfolk), Arthur E. Croager, P.P.G.D. (Kent), H. W. Packham, P.P.G.D. (Surrey), Jacques Abady, L.R., and Arthur Valon, L.R.

W. Bro. Normand appointed and invested his officers for the year 1924 5, the complete list being as follows:

W. Bro. Frank West	I.P.M.
Bro. H. L. Sheppard	S.W.
„ A. H. Henry	J.W.
W. Bro. J. Fred Wicks, P.M.	Chaplain
„ E. G. Smithard, P.M.	Treasurer
„ Walter T. Dunn, P.M., L.R.	Secretary
„ Frank Jervis, P. M.	D.C.
Bro. Fred. G. Cockey	S.D.
W. Bro. A. L. Croager	J.D.
Bro. John F. Simmance	Organist
„ E G. Bartholomew	I.G.
W. Bro. R. W. Foster, L.R.	Steward
„ James W. Foreman	„
Bro. John A. Brentnall	„
W. Bro. R. H. Goddard	Tyler

There were proposed as candidates for initiation Mr. John Alfred Williams, Assistant Secretary to the Tottenham District Light, Heat, and Power Company, and Mr. Clifford Adey King, Chairman of Messrs. Walter King, Ltd., Proprietors of the "GAS JOURNAL."

At the termination of the Lodge meeting, the Brethren adjourned to the Connaught Rooms, where dinner was served.

W.Bro. Normand, who presided, proposed the Loyal Toast, which was received with musical honours, and also gave "The M.W. the Grand Master, H.R.H. The Duke of Connaught and Strathearn, K.G." and "The M.W. Pro. Grand Master, the R.W. Deputy Grand Master, and the rest of the Grand Officers Present and Past." To the latter toast, W.Bro. W. A. Surridge, as P.A.G.D.C., replied in a very interesting speech, in the course of which he referred to the circumstance that he had, when W.M. of the Lodge fourteen years ago, initiated W.Bro. Normand (his nephew), that ceremony also having taken place in the Grand Temple. He conveyed greetings from W.Bro T. H. Martin, P.P.G.S.B. (Herts.), who served as Master of the Lodge in the year 1889, and had just celebrated his eightieth birthday.

In appreciative terms, W.Bro. Frank West, I.P.M., submitted the health of "The Worshipful Master." W.Bro. Normand, having acknowledged it, proposed that of "The Installing Master," to which W.Bro. West replied.

The toast of "The Visitors," proposed by W.Bro. Jacques Abady, P.M., L.R., in his usual finished manner, was responded to by four of the visiting Brethren—W.Bro. R. H. Sayers, P.P.A.G.D.C. (West Lancs.), on behalf of the Northern Star Lodge (No. 3053), in the absence of W.Bro. Ernest West, W.M. of that Lodge; W.Bro. R. J. Milbourne, J.P., P.P.G.P. (Salop), who is W.M. of the Murdoch Lodge (No. 3480); W.Bro. R. Struth Stewart, M.P.; and W.Bro. J. Entwistle, Town Clerk of Morecambe. Their observations, some reminiscent in character, were followed with close attention.

Proposed by the W.M., the toast of "The Past-Masters and Officers of the Lodge" was honoured. W.Bro. Alfred C. Beal replied on behalf of the former, and Bro. H. L. Sheppard, S.W., spoke for the latter.

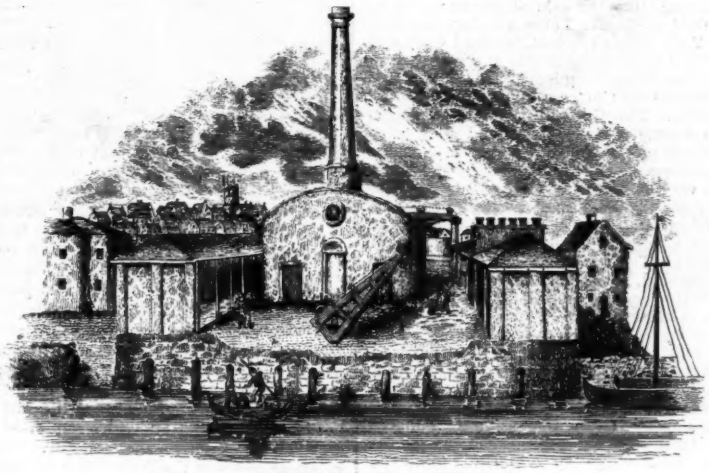
It only remains to add that the enjoyment of the evening was enhanced by a programme of musical and other selections, under the direction of W.Bro. Herbert Townsend.

Raw Materials and the Paint Industry.—Mr. Oliver Wilkins, Chairman of Messrs. Oliver Wilkins & Co., Ltd., of Derby, in a public lecture on Friday last on "The Manufacture and Properties of Pigments," said that up to 1914 Germany was the manufacturing centre for artificial dyes. This was now being rectified. Whereas before the war over 90 p.ct. of the aniline dyes were purchased from abroad, to-day only 25 p.ct. of our requirements were of foreign origin. Practically the whole of the dyes required for the English paint industry were now being made in this country.

YORK GAS COMPANY'S CENTENARY CELEBRATIONS.

One Hundred Years of Progress.

The principal streets and shops of York were lighted with gas on March 22, 1824; the original Company commencing operations with about 250 private consumers and the whole of the public lighting. Some thirteen years later an opposition undertaking, in which only consumers contracting to take their supply of gas from this new Company were eligible to become shareholders, made its appearance; and after a few years of uncomfortable, and probably unprofitable, competition, there was an amalgamation, leading to the establishment, by Act of Parliament in 1844, of the present Company, whose history has been—and we have not the slightest doubt will continue to be—one of uninterrupted progress. York is one of those happy places in which the gas industry grows both older and younger every day; and it was an excellent idea to couple with a worthy celebration last week of the reaching of the hundred-year stage, such overwhelming proof of youthful vitality and of increasing efficiency as is furnished respectively by a British Commercial Gas Association District Conference and by the inauguration of an installation of Glover-West vertical retorts. During the two days (Wednesday and Thursday) over which the proceedings extended, gas men from all parts of the country flocked to York; and on few occasions can there have been crowded into forty-eight hours so many nice things as were said in this period of the York Gas Company and of Mr. H. E. Bloor, B.Sc., B.Eng., their Engineer, Manager, and Secretary. From the first the York Gas Company has been in the forefront; and those who are now responsible for its administration may be relied upon to keep it there.



YORK UNION GAS WORKS,

BUILT 1837; DISMANTLED 1850. THE CHIMNEY STILL STANDS AND IS IN USE.

A Reception.

The centenary celebration proper may be said to have begun on Wednesday evening with a brilliantly successful reception by the Chairman and Directors of the York Gas Company in the historic and beautiful Assembly Rooms. The guests, who were received by Mr. Alfred Procter (the Chairman) and Mrs. Procter, included the Lord Mayor (Alderman W. Dobbie) and Lady Mayoress, Mr. H. Wade Deacon, C.B.E., J.P. (the President of the British Commercial Gas Association), Mr. Samuel Tagg (the President of the Institution of Gas Engineers) and Mrs. Tagg, Sir William Kay, J.P., Mr. and Mrs. Goodenough, Mr. and Mrs. Bloor, and many other prominent gas men and their ladies from Yorkshire and Lancashire, as well as from the Northern and Southern districts. There were also present numerous leading citizens of York.

Dr. Saleeby gave his well-known lecture on the wonderful cures effected by sunlight. A number of new lantern slides added interest and value to the lecture, which, as always, was listened to with the closest attention. Dr. Saleeby—introduced by Mr. Procter, who presided, as a York boy of whom they were all very proud—gave a really masterly exposition of the gospel of more sunshine, and the beneficial effects on health and happiness of the abolition of the smoke curse. He pointed the obvious moral that in gas and smokeless fuel lies the cure for a state of things that is a menace and disgrace to modern civilization.

Dancing, music, generous refreshment, and social intercourse provided one of the happiest evenings.

The Centenary Luncheon.

At the close of the British Commercial Gas Association conference sitting on Thursday morning, some 250 guests made their way to the Guildhall—one of York's precious old buildings, nearly 500 years of age—where they sat down to the centenary luncheon given by the Chairman and Directors of the Company. Mr. Procter presided, and with him at his table, among others, were Mrs. Procter, Mr. J. J. Hunt and Mr. James Melrose (Directors), the Lord Mayor and Lady Mayoress, Mr. and Mrs. H. E. Bloor, Mr. D. Milne Watson, Mr. H. Wade Deacon, Mr. and Mrs. S. Tagg, Mr. and Mrs. F. W. Goodenough, Sir William Kay, Alderman Fred. J. West, Alderman Sir A. Ball, and Alderman J. P. Buck. Those seated at the two centre tables included Mr. John Cross, Mr. C. B. Johnson, Mr. Edward Bushell, Mr. George Sharp, Mr. Arthur Pollard, and Mr. J. R. Hill (Directors of the Company), Mr. W. Doig Gibb, Councillor F. Wilkinson, Mr. C. Wood, Councillor W. Cunnliffe, Mr. H. E. Copp, Mr. C. S. Shapley, Mr. T. P. Ridley, Mr. J. Paterson, and Mr. F. P. Tarratt. Among those regretting inability to be present was Dr. Charles Carpenter, the President of the South Metropolitan Gas Company.

The Loyal Toasts having been honoured at the call of the Chairman,

Mr. D. Milne Watson (Governor of the Gas Light and Coke Company and President of the National Gas Council) proposed: "The York Gas Company." He said he considered it a very great honour indeed to have been asked to submit this toast on such an important occasion as the centenary luncheon. He had been invited to be present as President of the National Gas Council, and also as the Governor of the "elder sister" of the industry, the Gas Light and Coke Company—an eligible lady 112 years old, and still going very strong; and it gave him great pleasure to come and propose the health of the "younger sister," the York Gas Company, aged 100. The formation of this latter Company was actually brought about in the Guildhall in which they were meeting that day. He must congratulate the York Gas Company upon the great progress they had made since those early days. It was a special pleasure to him to come to York, because that city happened to be the nearest neighbour of the Gas Light and Coke Company. The Gas Light Company, when originally founded in 1812, claimed all the territory as far as York; and he had come up there, not, it was true, to discuss the question of the settlement of the districts of supply as between the two Companies, but at any rate to visit the undertaking which was the nearest neighbour of his own. To become serious, it was a great pleasure to note the progress of the York Gas Company, of whose doings they frequently heard. They knew that the Company had an absolutely up-to-date plant—Mr. West told him that it was the best plant of its kind in existence [Laughter]—and they knew the Company had a wonderful system of distribution, and that their supply of gas was excellent. They had seen what a beautiful showroom they possessed, and were aware that the whole business was in the hands of most capable and competent men—Mr. Procter (the Chairman) and Mr. Bloor (the able Engineer and Secretary). For these two gentlemen they all had the greatest possible respect, and they knew perfectly well that the future of the Company was safe in their hands. The York Gas Company had always associated themselves with national affairs; they had never taken a parochial view of their duties. They were among

the first to join the National Gas Council, and they also joined the Federation of Gas Employers, without whom he did not know where they would all be to-day. Further than this, they had always supported the British Commercial Gas Association, and he thought it showed their width of mind and their breadth of vision that, instead of concentrating in their centenary celebrations upon themselves, they had asked the "B.C.G.A." to hold a conference there and to take part in the celebrations. No more emphatic evidence than this could be found of the national spirit by which the York Gas Company had always been actuated. They were citizens of no mean city, and they were members of no mean industry.

The CHAIRMAN said his first duty was to express their hearty and sincere thanks to Mr. Milne Watson for his kindness in coming down from London to York to help in the celebration of the centenary, and for the encouraging words he had just spoken. Mr. Milne Watson had alluded to the National Gas Council, and one could not avoid remarking on an occasion like this how very great their obligations were to this central body, which had been ably presided over by Mr. Milne Watson, and most skilfully led by him through many dark days during the past years. It was to this work that they owed the very favourable position occupied by them to-day. He had no hesitation in saying that, but for the work of the National Gas Council during the past twelve years, the gas industry to-day would have been in a perfectly hopeless position. From the booklet entitled "A Century of Light," which had been edited by Mr. Bloor, they would be able to gather many interesting particulars regarding the history of the York Gas Company. Beginning a hundred years ago with a price of 13s., they had by 1913 got down to 2s. 1d. per 1000 c.ft., which figure by 1923 had had to be increased to 3s. 2·4d. The 1924 consumers of eighty years ago had grown to 22,474 in 1923, while in the same time the sale of gas had gone up from 23 million c.ft. to over 652½ millions. Those who had administered the gas undertaking in York during the past hundred years had rendered good service. They had sold a good article at a price which had been always among the lowest in the kingdom. This service had been, and was now, recognized, and the Company had the goodwill of those among whom they worked. The Council had had an opportunity some years ago of purchasing the works, but had decided to leave the undertaking in the hands of the Company, and he was sure they had had, and would have, no reason to regret this decision. From the magnificent installation of vertical retorts which had been inaugurated on the previous day, they anticipated obtaining excellent results. These verticals were capable of making daily 2½ million c.ft. of gas of first-class quality, which would be produced with very much greater economy than from the old plant. The conjunction of two such important events, the Directors decided, required some sort of recognition. They had to thank all their guests, who had rallied round and supported them. He wished, in fact, to voice the recognition which his colleagues and himself felt was due to everyone who had contributed in any way to the celebration of the centenary. He had to thank the Lord Mayor for giving them the opportunity of meeting in that magnificent hall. As to Mr. Bloor, he had been with the Company eleven years, and his work had been of the very best. He was always pursuing a far-seeing and bold policy. It was impossible to indicate to them all the work that Mr. Bloor had put into this centenary celebration. The Board were under great obligation to him, and to all the members of the staff who had assisted him. They had a very loyal and efficient staff, and the Directors felt that they should be associated in these celebrations. Provision had already been made for marking in an adequate way the Board's recognition of the good services which were always rendered to them. One form of this recognition would be the sending of the whole of the staff to the great British Empire Exhibition at Wembley. But, of course, this was only part of what they intended to do.

Mr. BLOOR was called upon, and said it had been a labour of love to him to prepare for these celebrations. It had been a great joy to him to see so many friends gather round, and he hoped they would go away feeling that the celebrations had been worthy of their object. He had had the utmost possible assistance from everyone connected with the Company. It would have been quite impossible for one man to organize such a function without this help.

Alderman Sir ALBERT BALL, J.P., of Nottingham, submitted "The City of York," and remarked that he believed York possessed one of the best gas engineers in the country, and he sincerely hoped that the gas undertaking there would continue to be of the greatest help as a servant to the public—for, after all, the gas industry was a servant, and one of the best servants (as they found out during the war) that the public could have. He had for something like twenty years been Chairman of a large gas undertaking in the Midlands, and had had considerable experience of conferences, and he did not think he had ever met a better body of men, or one that could better advertise their industry [Laughter], than gas men. He hoped the gas engineers of this country would see to it that, while working hand in hand with the electrical undertakings, their own industry was kept to the front, so that in another hundred years' time, when this wonderful York Gas Company celebrated their bi-centenary, as much progress would be shown as they were able to point to on the present occasion. Some years ago in Nottingham they put down an installation of Glover-West vertical retorts which had given, and continued to give, the greatest satisfaction.

The LORD MAYOR, in response, assured those present that it had been a great pleasure to the citizens to welcome them to this old and historical city. On behalf of the Corporation, he thanked the British Commercial Gas Association for their efforts for the good of the whole community.

Alderman Sir WILLIAM KAY, J.P., of Manchester, proposed "The British Commercial Gas Association," and said it was beyond the bounds of imagination to picture what the position of the gas industry would now have been without this Association. It had proved the marvellous value of organization in connection with such an industry, and it had brought about that interchange of opinion which went further than anything else to secure success. The effect of the "B.C.G.A." upon the undertaking which he had the great honour to represent had been remarkable. They all knew how bad the state of trade was; yet, strange to say, they were experiencing a remarkable increase in the sales of gas in the City of Manchester, and this could only have been brought about by educating the public as to what could be done with the aid of gas. The privileges which the industry enjoyed should be exploited to the full for the benefit of the community. On the previous day, at Leeds University, there had been inaugurated an experimental plant which he trusted would be of the greatest service to the industry and to the whole community.

Mr. H. WADE DEACON, C.B.E., J.P., of Liverpool (the President of the British Commercial Gas Association), returned thanks for the hospitality that had been extended to the guests. He took occasion to point out that the Association did not run itself. The whole organization depended upon the Chairman of the Executive Committee, and they had an excellent Chairman in Mr. Goodenough. Since the Association was formed in 1911, there had been a tremendous increase in the consumption of gas. While the "B.C.G.A." could not, of course, claim the credit for the whole of this increase, a great part of it was undoubtedly due to their publicity work.

Mr. JAMES MELROSE, J.P., who is 96 years of age, and has been a Director of the Gas Company for over 40 years, proposed "The Visitors" in a speech containing interesting reminiscences. He said he remembered well the building of the works of the competing undertaking, the York Union Gas Light Company, formed in 1836.

Mr. SAMUEL TAGG, M.Inst.C.E., of Preston (the President of the Institution of Gas Engineers), in reply, said they had all much enjoyed their visit to York. For something like 25 years he had been associated with Mr. Bloor, and for him he had nothing but praise. For all the arrangements that had been made, for the privilege of witnessing the latest technical developments in the manufacture of gas and the unique historical exhibition, for the social functions, and for all the other things which betrayed so much thought for the convenience and pleasure of the visitors, he tendered on their behalf the most sincere thanks to the York Gas Company.

An Historical Exhibition.

Every visitor to York who, between the various functions, could snatch the necessary time, visited the Company's handsome showrooms in Davygate. Here they were able to occupy themselves fully by contrasting ancient with modern, and noting the various stages of improvement, for, along with all that is newest, was a unique exhibition of appliances illustrating a hundred years of progress, together with historical documents of surpassing interest. The popularity of this exhibition will be understood when it is mentioned that last Saturday week 1500 persons visited it. From the earliest times the pioneer Gas Companies in York stocked a variety of fittings which they supplied and fixed on reasonable terms; and this policy has been developed right down to the present time, when the Company have showrooms which are a great credit to themselves, and must be a delight to the citizens. Everywhere there is space to move about and to admire well-selected and well-arranged modern appliances for the utilization of gas for lighting, heating, cooking, and hot-water supply.

On entering the offices, a number of essays and desirable prizes were seen set out on the counter. One feature of the centenary celebrations was the promotion by the Company of essay competitions for boys and girls, the subject for the former being "Gas Manufacture and Distribution," and for the latter "The Uses of Gas." This proved itself a first-rate scheme, for nearly 1000 entry forms were issued, about half of which were returned with essays for adjudication. A study of the prize essays on view reveals the fact that they constituted a splendid tribute to the interest the children take in their work and to their ability of expressing their knowledge both in writing and by drawings.

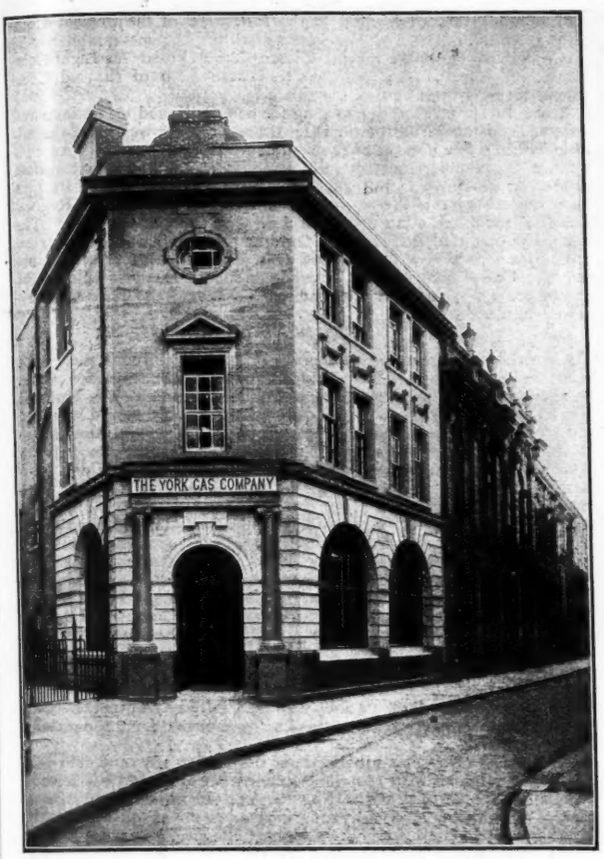
In the centre of the main showroom was a striking display of café hot-water and domestic hot-water appliances manufactured by the Eclipse Copper Company, of York—testimony to the fact that the manufactures of the city will bear comparison with those of other parts of the country.

Coming then to the historical exhibition, there was open to inspection an extraordinarily complete collection of ancient books and documents relating to the supply of gas in York. From the original order book for supplies of gas, it was seen that the first consumer's name to be entered was William Lockwood, chemist, who was an ancestor of the late Sir Frank Lockwood, K.C., M.P. In 1824 he applied for a supply of gas. A rather amusing exhibit related to the contribution by the Company of ten guineas to the provision of a new Minster bell, on the ground that it would prove useful to the works of the Company and the men employed therein. Literature of the early Company before the amalgamation was of special interest as showing the progressive commercial and service policy followed at that time. Side by side with Acts of Parliament, &c., was an original specification (dated 1824) for cast-iron retorts, and cast-iron lamp pillars, by Messrs. James Oakes & Co. (now incorporated in the Stanton Ironworks Company), of Alfreton Iron-Works. There was also a letter from Leeds, making urgent request for the loan of some gas-burners, which were sent by the "Highflier" coach.

A bound volume of the "Yorkshire Observer" lay open at p. 104 of the issue dated Jan. 25, 1823, from which the following has been extracted:

ORIGIN OF GAS ILLUMINATION.

In the year 1627, John Hacket and Octavo Strada obtained a patent for rendering coals and wood useful without smoke. There is no evidence to establish, in positive terms, that illumination by gas is here meant, though the language used seems scarcely open to any other inference; but, in a work published at Frankfort, in the year 1685, entitled "Foolish Wisdom or Wise Folly," we have the conversion of coal and wood into gas and coke most distinctly claimed as the discovery of a preceding period: "In Holland there is turf, and in England there are coals, neither of which are good for burning in apart-



Frontage to St. Helen's Square and Davygate. The Accounts Office Entrance.

ments or in smelting houses. I have, however, discovered a method of burning these into good coals, so that they not only produce no smoke or bad smell, but yield as strong a heat for melting materials as that of wood, and throw out such flames that a foot of coal shall make a flame 10 ft. long. This I have demonstrated at the Hague with turf, and proved in England with coal, in the presence of Mr. Boyle, and by experiments at Windsor, on a large scale. It deserves also to be remarked that the Swedes procure their tar from fire-wood. I have procured tar from coal which is, in every respect, equal to Swedish, and even superior for some purposes. I have tried it both on timber and ropes, and found it very excellent. The King himself ordered a proof of it to be made in his presence. This is a thing of very great importance to the English, and the coals, after the tar is extracted, are better for use than before."

Outside the document room was a modern Crossley town-gas engine, of 5 B.H.P., net weight 6¼ cwt. Visitors were requested to note the progress made in design and construction, as compared with a vertical 3-H.P. Crossley gas-engine built in 1867.

Passing over the series of antique illuminating appliances from the Yorkshire Philosophical Society's Museum and other sources, mention must be made of the extraordinarily complete range of gas-burners, from the earliest form of rat-tail to the most modern incandescent types. A number of these burners were from the South Metropolitan Gas Company's and the York Gas Company's collections. The names of Sugg, Bray, Peebles, Welsbach, Kern, and the New Inverted Company appeared; there were the Leslie and the Deimel argands; the "Wenham" (1882) and the "Cromartie" (1884) lamps; and a handsome brass "Merchant" pillar, with three-arm fitting and one centre burner (1874), provided with exquisite hand-painted opal glass. A variety of burners were shown in use, so that the different types of flames could be studied. The Welsbach Company loaned a complete range of incandescent mantles.

In an almost equally complete range of glassware, the beauty of the early types shown was very noticeable. The spreading flames of the burners at one time would not allow of globes being used, and so the saucer pattern glass, with 2¾ in. bottom opening, came first. Later, owing to improvements in the design of gas-burners, deeper shades were permissible, and saucers developed into cups and basins, and globes, adapted for 2¾ in. holders. The intense draught caused by openings of this restricted size, however, produced unsteadiness of flame. In order to counteract this, shades to take 3¾ in. holders were introduced, and found to be a marked improvement. Later "Comet" holders, having a 4¼ in. span, were evolved, and became the standard type. There followed upright incandescent globes, "Holophane" glassware, various globes for Kern burners, and early inverted types, right up to the heat-resisting "Vitreosil" and "Supastone" materials. Gas brackets and chandeliers of all ages could be compared. Many of the old-fashioned pendants and globes were costly, but of exquisite design. In the case containing the collection of upright brackets was a bitumen sheath of a gas-main laid so long ago that the whole of the metal had corroded away, leaving the sheath still intact.

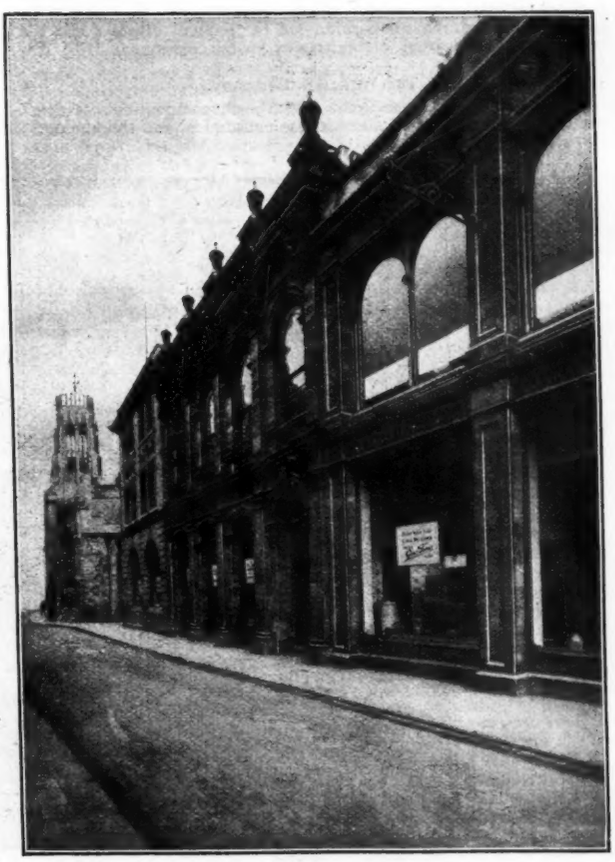
Passing round the room one saw another instance of modern invention being anticipated in the model of W. T. Carpenter's patent gas-making plant, working on the principle of carbonizing coal in retorts which emptied directly into the chamber intended to be used for the purpose of making water gas. This apparatus was patented in 1868, and must have proved of extreme interest to gas engineers—a remark which applies also to a model of a stoking machine dating from the same period, and designed and made by the same inventor.

A good display of meters included two Defries (1865) circular type with three diaphragms; a glass-cased exhibition meter by Messrs. George Glover & Co.; a dry gas-meter made in 1844, loaned by Messrs. Thomas Glover & Co.; the first slot-meter, invented by Messrs. Thorp and Marsh in 1889, and made by Messrs. Sawer and Purves.

Turning to old gas-consuming apparatus, there was a gas-stove for lighting and heating, patented by George Neall, of Northampton, in 1856, loaned by the Birmingham Corporation Gas Department. Warming and ventilating stoves made in York in 1880 were on view; the "Sundial" (1880) cooker, loaned by Messrs. T. Lambert, Ltd.; the well-known cooking stove by Sharp, of Northampton (1850), loaned by the Wellingborough Gas Light Company; and a cooker having separate ring burners on the top, and cast-iron sockets on the sides evidently intended to hold plates for warming (1880), loaned by Messrs. Fletcher, Russell, & Co.; an old Giles patent kitchener, showing flue outlet near the bottom, burners outside the oven, and luminous burners on the hotplate, loaned by the Birmingham Corporation Gas Department; and a cooker made by Earnshaw (1870), loaned by the Newcastle-on-Tyne and Gateshead Gas Company. A hotplate dated 1880 was of particular interest, as it showed that the designer intended the flames to burn without touching the metal.

A Fletcher gas-washing machine, made in 1879, loaned by Messrs. Lambert, Ltd., was declared to be still an excellent appliance, and in as good order as when new. By the courtesy of the South Kensington Museum, the earliest Maughan geyser was displayed.

The evolution of the gas-fire from the earliest to the most modern could be studied, thanks to a series of patterns shown by Messrs. Wilsons and Mathiesons and Messrs. Fletcher, Russell, & Co. An Arden Hill "Acme" fire with iron frets was on view, and samples of the "Metro" fire, and the Richmond log fire. Inset fires were represented by Main's "Cinderella," Wilson's "Sunbeam" and "Register," and Fletcher's "Glow."



Davygate Frontage; the Ancient Church of St. Helen in the background.

"A CENTURY OF LIGHT."

From a handsome and beautifully illustrated souvenir booklet bearing the above title, the following particulars have been extracted:

The York Gas Light Company.

On Sept. 13, 1822, formal notice was given of the intention of the York Gas Light Company to apply for parliamentary powers; and at a meeting of influential citizens held in the Guildhall Jan. 23, 1823, the proposal assumed definite shape. Application was made to Parliament on March 22, 1823, and the Royal Assent was given to the Act on May 30 of the same year. A plot of about 2 acres of land, on the banks of the Foss, near Monk Bridge, was purchased, and the erection of works thereon proceeded with. On Tuesday, March 23, 1824, the following appeared in the "York Courant" (since incorporated with the "Yorkshire Herald.")

"York Lighted by Gas."

The works of the York Gas Light Company having been completed, the principal streets and shops of this city were lighted with gas last evening, and presented a very brilliant appearance. The large lamp in the Pavement had a very good effect, and the contrast in all parts was strikingly apparent between the dull and murky glare of the oil-lamps with which the city has hitherto been lighted and the brilliant illumination emitted from the gas. The fitting up of the lights in the several shops, &c., is very splendid, and the large circular light over the door of Mr. Barber, at the Black Swan, was generally admired. A merry peal from the Cathedral Bells ushered in the introduction of the new era of light in old Ebor, and the streets were thronged with spectators till a late hour.

The Company commenced with about 250 private consumers and the whole of the public lighting. Gas was at first charged by contract. On May 17, 1824, it was announced that all persons contracting for gas to the amount of £6 per annum might be allowed the use of a meter, the charge for the gas so registered being at the rate of 13s. per 1000 c.ft. On Oct. 25, 1826, it was resolved that any consumer of gas (except those under contract until January, 1827) might be supplied by meter. From Oct. 1, 1824, street lighting by gas became general throughout the city.

The York Union Gas Light Company.

Encouraged by the success of the pioneer undertaking, a general meeting of subscribers to a proposed Joint Stock or Co-partnership Company, in which only consumers contracting to take their supply of gas from this new Company were eligible to become shareholders, was held at the Merchants' Hall on May 17, 1836, when the formation of such a Company was formally approved. A site adjoining the River Foss, in Hungate, was purchased in the July following, and the building of works immediately commenced. The Company were legally established by a Deed of Settlement dated Jan. 26, 1837, which bears the signatures of 153 shareholders, and were in a position to supply gas to consumers from Oct. 1. 1837.

It was unfortunate for the new Company that, as a result of the preliminary operations, on Nov. 8, 1838, an Umpire, appointed to arbitrate between the rival concerns, awarded £533 5s. 6d. to the original undertaking in respect of injury done to mains. As may be readily imagined, the competition led to frequent disputes and the unnecessary duplication of gas-mains, with consequent road disturbance.

The York Gas Company.

After seven years, it was realized that such competition was detrimental to the interests of citizens, gas consumers, and shareholders; and an amalgamation leading to the formation of the present Company resulted. The York Gas Company thus became established by Act of Parliament under the title of the "York United Gas-Light Company," on July 19, 1844; six Directors from each of the old Companies forming the Board of the new one.

The contract method of charging for gas continued to be favoured by some consumers until after 1844, though meters were made available within a few months of the commencement of supply. As confidence in gas-meters became fully established, the volumetric system gradually superseded the earlier method, but has now in its turn been ousted by the therm system introduced by the Gas Regulation Act, 1920, and adopted by the York Gas Company in 1922. The Company operated under the maximum price and dividend system until 1912, in which year the York Gas (Consolidation) Act was obtained. Under this Act the Company adopted the principle of the sliding-scale of price and dividend, and assumed the present abbreviated name.

The Works.

After the amalgamation, the plant of both works continued to be used until extensions at Monk Bridge allowed of concentration there. In 1847 adjoining land was acquired for this purpose. The Hungate Works were closed from January, 1850; the plant being dismantled and disposed of, and the site sold by auction. The retort-house chimney still stands, and is in use. The oldest existing plant in the Monk Bridge Works dates from 1847. Considerable additions were made in 1871, and up-to-date plant has from time to time been installed.

The works promising soon to become inadequate, additional land was secured in 1879 and 1881 on the Heworth Green side of the River Foss, opposite to the then existing works. Upon a portion of this land was built between 1880 and 1885 an entirely new and complete works, to the designs, and under the supervision, of Mr. Vitruvius Wyatt, then Engineer to the Gas Light and Coke Company, London. The two works were connected by a bridge over the River Foss, and were capable of being worked either jointly or separately.

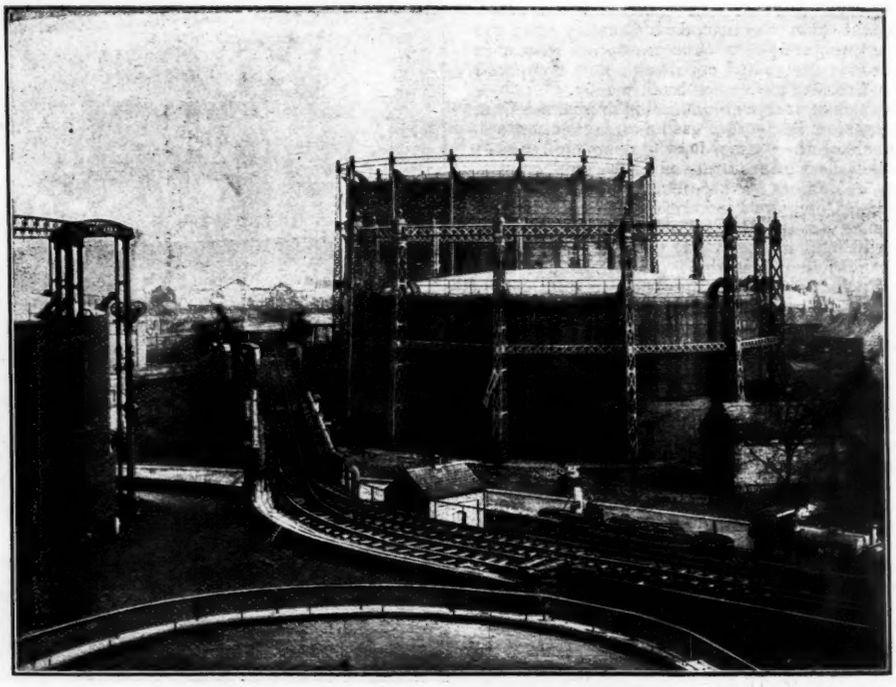
Coal for gas making in York had, at first, to be carried by water, and the works of the competing Companies were both conveniently situated for this purpose. Later, however, railway transport became available, and for many years coals, &c., were carted from the railway depots.

Overhead Railway.—The acquisition of the land in 1879 and 1881 permitted of a junction with the then recently constructed Foss Islands Branch of the North Eastern Railway, and advantage was at once taken of this facility, thus diverting cartage to the extent of probably 50,000 tons per annum from the streets of the city, and so saving the citizens considerable inconvenience by the congestion of traffic and cost in the repair of roads.

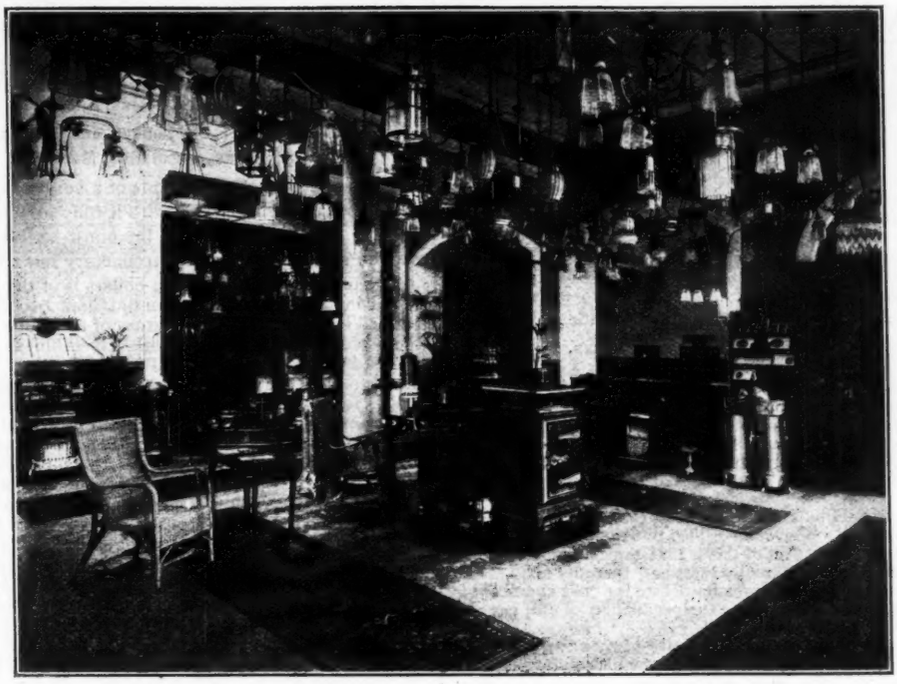
Gasholders.—Gasholders constructed in 1857 and 1867, each of 400,000 c.ft. capacity, are still in use. A holder of 240,000 c.ft. capacity (now disused), erected in 1847, was, at that time, reputed to be the largest gasholder in Yorkshire. Additional holders of 750,000 and 1,016,000 c.ft. capacity were completed, in 1884 and 1892 respectively, on the new works.

Carburetted Water-Gas Plant.—In 1899 and 1901 two complete carburetted water-gas plants, each unit of 750,000 c.ft. per day capacity, with oil storage and all necessary equipment, were installed.

Retorts and Carbonizing Machinery.—On the old works the retort-settings have on several occasions been remodelled in accordance with new and improved methods; better working results being thus obtained. In 1915 and 1916 mechanical stoking and coal and coke handling plants were introduced with great advantage, the Company by this means being able to meet all demands, in spite of the shortage of labour,



RAIL AND WATER FACILITIES, AND A HOLDER BUILT BY A YORK FIRM IN 1884.



INTERIOR OF THE SHOWROOMS.

during the war and the boom period immediately following. This plant having served its temporary purpose, will be put out of action consequent upon the installation of vertical retorts.

General.—In 1848 it was the proud boast of the Company that they then possessed one of the best equipped and most up-to-date works in existence. Such a position is difficult to maintain, but the provision of the new works between 1880 and 1885 again placed the Company in the forefront. It is the intention of the Directors to merit the confidence of gas consumers by availing themselves, as occasion serves, of the best modern methods in order to keep their plant abreast of the times; and it is of interest that the opening of an installation of vertical retorts of the most modern type coincides with the celebration of the centenary of the Company. The works as now remodelled are capable of dealing with a maximum daily production of 12,000 therms of vertical retort gas and 3600 therms of carburetted water gas, or a total of 15,600 therms per day; and there is storage accommodation for over 2½ million c.ft. of gas.

The Distribution Department.

To ensure the satisfaction of their customers, each of the pioneer Companies stocked a variety of gas-fittings, which they supplied and fixed on reasonable terms. The present Company have developed along these lines, and, in order to cope with the expansion of business, in 1883 provided central showrooms, Board-room, offices, and workshops in Davygate. These have since been considerably extended, and may now be regarded as among the finest premises devoted to these purposes in the kingdom.

Prepayment Meters.—To meet an evident demand, the Company adopted the prepayment meter in 1898, with an inclusive charge for gas and rentals; the latter now including meter and lighting, heating, and cooking appliances. This brought gas for these purposes within the reach of many who could not afford to equip their own homes, and led to a large accession of small domestic consumers.

Lighting.—The century has witnessed constant improvements in gas-burners, leading to economy in consumption and increased luminosity. Such efforts were ably seconded by the glass manufacturers, who gradually evolved shades which assured steadiness of flame. Gas lighting, however, was completely revolutionized by the introduction of the Welsbach light in 1887, giving, with its bunsen flame and incandescent mantle, a greatly increased illuminating power. This was but the beginning of a new era; and the original upright burner has been succeeded by different types of the Welsbach-Kern burner, inverted burners, high-pressure burners, self-intensifying burners, and cluster burners, giving a still further enhanced value to gas as an illuminant. These developments have in turn been assisted by the introduction of glassware unaffected by intense heat or cold, so permitting incandescent lighting to be used in exposed positions for which it was hitherto unsuitable.

Gas-Cookers.—The York Gas Company were among the first to foresee the great possibility of service to consumers by the use of gas for cooking, and some of the earliest single-cased sheet-iron gas-cookers were made by the Company and other York makers. Gas-cookers with double casings, separated by a lining of non-conducting material, came into general use about 1880, and have since been considerably improved both in appearance and efficiency. Early in 1884 the York Gas Company commenced to loan such cookers on hire; and to such an extent has this facility been appreciated, that upwards of 13,000 cookers and grillers are now loaned by the Company. It is of great interest to note that the public, in ever increasing numbers, prefer to purchase gas-cookers and other appliances of their own selection; and this tendency is a convincing proof that the repute of gas, after a hundred years, stands higher than at any previous period.

Gas Heating.—A gas-fire, manufactured by Mr. Henry Wilson, of Leeds, was exhibited by him at the Birmingham Exhibition in 1878. Since then gas-fires have been the subject of much labour and research, resulting in continuous progress, and now combine beauty of design with perfectly hygenic construction. They are rightly regarded as highly evolved and scientific apparatus, suitable for use in all circumstances. Such a claim could not have been made for many of the gas-heating appliances of earlier periods; and the fact that it can now be advanced without qualification, for all typical modern gas-fires, is a factor of primary importance to the future of the industry.

Service to Consumers.

From the very early days, the management of the York Gas undertaking appears to have been aware of the importance of securing the use of properly designed apparatus, fixed in accordance with a high standard of workmanship. Posters and leaflets of a very early date are still extant, informing the public of the intention of the Company to maintain a stock of reliable gas-apparatus, and willingness to fix such apparatus by the Company's own workmen—satisfactory workmanship being "guaranteed." At the present time the showrooms of the Company are generally regarded as among the finest examples of such showrooms, and have been much admired, and are undoubtedly appreciated by the public.

As early as 1901 an offer of maintenance of consumers' fittings on reasonable terms was made, consequent upon the extended use of the incandescent light. This feature of the Company's service was much appreciated, and has now assumed considerable proportions. In December, 1921, the Company inaugurated a system of inspecting gas installations from house to house, with the object of ascertaining the condition of the whole of the gas-apparatus in use, and making any adjustments found necessary. It was quickly seen that this work was of sufficient value to be made a permanent feature of the Company's system. The staff has been largely increased, and its work has given great satisfaction to consumers, many of whom are shown by the Company's experience to be very diffident in making complaints.

The Company's policy is to recognize the fact that gas-appliances do require occasional expert attention; and as all experience shows that this cannot be given by the average consumer, the Company has undertaken the work itself. It is confidently believed that the expense will be more than recouped in the increased efficiency of gas-appliances, and the comfort and convenience of consumers.

Public Lighting.

In the early history of the Company the charge for public lamps appears to have been a frequent cause of contention between the Local Authorities and the Directors. In 1866, however, an agreement was entered into which was only terminated in December, 1900, owing to the uncertainty of the coal market consequent upon the South African War, and its probable effect upon the price of gas. From that time charges have been settled amicably, and the Company have recently entered into a contract with the City Authorities, which they believe will be mutually advantageous, for the lighting of the bulk of the city lamps for a period of ten years, subject to certain reasonable conditions. The stability thus afforded has enabled the Company greatly to improve the street lighting service.

Gas was first introduced for street lighting, and considerable historical and sentimental interest therefore attaches to this portion of a gas company's business. It is a matter of gratification to the management that, although the Corporation are the owners of a competitive source of light, they should still entrust the greater part of their street lighting to the York Gas Company.

Table Showing Progress of the Company's Business.

Year.	Price of Gas.	Number of Consumers.	Gas Sold.
	s. d.		C.Ft.
1824	13 0	Not known	Not known
1833	13 0	Not known	Not known
1843	6 8	1,924	23,000,000
1853	5 6	2,678	43,922,000
1863	3 9	4,654	85,574,000
1873	3 4	7,540	145,236,000
1883	2 6	10,050	237,176,000
1893	2 3	10,833	351,150,000
1903	2 2	15,676	492,781,000
1913	2 1	21,209	532,440,000
1923	3 2·4	22,474	652,678,000

The Glover-West Vertical Retorts.

The general principle of the Glover-West system of continuous vertical retorts is known throughout the gas industry. Coal from overhead storage bunkers passes through a specially designed valve to a feed-hopper, which forms an extension of the retort, into which coal passes under the influence of gravity, and the retort is always full. The rate at which coal enters is determined by the speed at which the residual coke is continuously withdrawn at the base of the retort by means of the coke extractor.

The retort in this installation is of the latest type. The upper part is elliptical in shape, as in previous designs, but the base is expanded to a circular section. The effect of this is that the column of coke in the retort is opened out, and a greatly increased quantity and surface is exposed to the action of the steam admitted to the coke chamber for the purpose of generating water gas. The production of coal gas and water gas proceed simultaneously.

The setting retains the characteristic series of horizontal heating chambers, each separately adjustable, so that the distribution of heat throughout the length of the retort is under complete control. New principles embodied are the internal waste-gas uptake, the use of the secondary air uptake in the back wall as at once a regenerator and an insulator, and the provision of a secondary point of combustion in the heating chambers.

The steam for use in the retorts is generated in waste-heat boilers of the natural-draught water-tube type, each fitted with automatic feed control, and high and low water alarms. Heat is thus recovered from the waste gases, and returns to the retorts in the shape of superheated steam. Sufficient steam is generated in each boiler for the use of the setting to which it is attached.

The coal and coke-handling plant forms a striking feature of the installation. Both coal and coke are handled by one line of the recently introduced West's lip-bucket conveyor. Coke may be discharged from the conveyor either into a battery of steel-and-brick hoppers fitted with outlets and doors for the supply of road vehicles, and situated at one side of the retort-house, or conveyed back to a hopper situated over the railway siding in such a manner that a wagon may be emptied of coal and filled with coke without being moved.

The retort-house is a pleasing structure consisting of steel framework filled in with pressed red brick. In addition to an electric lift, the building is equipped with platforms and staircases, and is exceptionally well lighted and ventilated, so as to ensure the best possible working conditions for the men employed.

Wembley World Power Conference.

The First World Power Conference is to be held at the British Empire Exhibition from June 30 to July 12, under the Presidency of the Right Hon. the Earl of Derby, K.G. We learn from the "Bulletin" of the British Commercial Gas Association that a thoroughly comprehensive programme dealing with the world resources and utilization of fuel has been drawn up, and the following papers are to be read on behalf of the Gas and Fuel Section: "Illumination by Gas," by Dr. J. S. G. Thomas and Mr. Dean Chandler; "Industrial Use of Gas," by Sir Arthur Duckham, K.C.B., M.Inst.C.E.; "Coke as Fuel for Steam Raising," by Mr. E. W. L. Nicol, M.Inst.Mar.E., A.Inst.E.E.; "Fuel Conservation and Smoke Abatement," by Mr. F. W. Goodenough; "Science in the Gas Industry—Present, Past, and Future," by Prof. J. W. Cobb, C.B.E., B.Sc., F.I.C.; "The Present Position and Future Prospects of the Gas-Making Industry," by Mr. D. Milne Watson, D.L.; "Future Use and Application of Gas-Engines (Coal Gas) in the Use of Power," by Prof. F. W. Burstall, M.A.; "The Co-ordination of the Use of Fuel," by Mr. E. W. Smith, D.Sc., F.I.C.; "The Bye-Products of Coal Distillation in Relation to Power Production," by Mr. W. G. Adam, B.A. (Oxon). This list is, says the "Bulletin," not necessarily exhaustive, and further papers may possibly be arranged; but it is already certain that the conference will be of the utmost importance and value both to the gas industry and to the fuel industry in general, and will speak with the highest authority, and carry great weight in the scientific, industrial, and commercial worlds.

Southern Association of Gas Engineers and Managers (Eastern District).—There is to be a county meeting of the Eastern District of the Association on Thursday, April 10, at 2.30, in the Lion Hotel, Guildford.

Gas-Firing (Flame Control).—At a meeting of the Society of Engineers, next Monday (April 7), at 5.30, in the apartments of the Geological Society, Burlington House, W., Mr. A. C. Ionides is to read a paper on "Gas-Firing (Flame Control)."

TRANSMISSION OF HEAT IN BOILERS.

By W. Newton Booth, B.Sc., Assoc.M.Inst.C.E., of Woolwich Arsenal Gas Factory.

[A Paper read before the London and Southern District Junior Gas Association, March 21.]

The subject I have chosen is of a very comprehensive nature, and it is impossible to deal with it fully in the space of a short paper. The treatment must therefore be sketchy, and no time can be spared for merely introductory remarks.

The transmission of heat in boilers is of the same general character in all cases. The potential heat of the fuel is first expended in raising the temperature of the flame gases. These are then brought into contact with a metallic surface, and give up some of their heat thereto. This heat is then conducted by the metal to its other surface, and is there transmitted to the water and expended in the production of steam. This may look a simple process; but the mechanism of the transfer of heat from a moving gas stream to a metal surface is by no means a simple matter, and the rate of transmission is modified to an enormous extent by variations in the nature of the flow of gas.

It is therefore necessary, in the first place, to consider the conditions which affect the flow of gas adjacent to a solid surface. The simplest possible case is that of a fluid flowing in a round pipe. This question was very fully discussed in Mr. Stephen Lacey's paper before the Institution of Gas Engineers at their last meeting. Any fluid flowing through a pipe experiences a frictional resistance to the flow which varies with the nature of the fluid and the rate of flow. Such resistance causes a drop of pressure along the pipe, and can consequently be measured as a pressure loss per unit length of pipe. If, now, the resistance is determined experimentally at various rates of flow, and the results are plotted on squared paper, we get a curve looking very much like the half of a parabola; but if, instead of using ordinary squared paper, logarithmic paper is used, the result is as shown in fig. 1. Up to a certain velocity the resistance is found to be

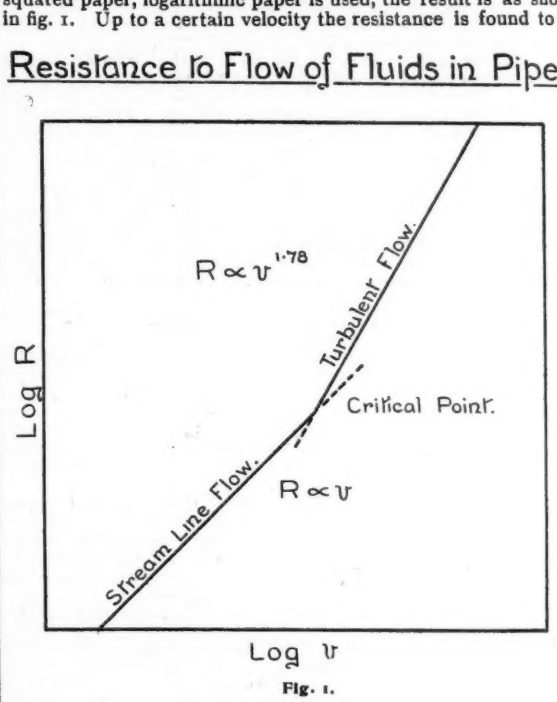


Fig. 1.

directly proportional to the velocity of flow; but above this velocity the law changes, and the resistance becomes proportional to a higher power—generally nearly the square—of the velocity.

What happens at this critical point to cause this change? The experiment illustrated in fig. 2 will suggest an answer. If water is allowed to flow through a tube as shown at A with a comparatively low velocity, and by means of a fine tube and jet a small stream of a coloured liquid of the same density and viscosity is injected into the centre of the water stream, this coloured stream will be carried as a separate filament right through the water stream, without any appreciable mixing taking place. The same phenomenon will occur if the coloured stream is injected into any part of the water stream. This indicates that, under these conditions, the water is flowing in parallel non-intermixing streams; and this condition is known as stream-line flow. If the flow of water is increased, the same stream-line flow will continue for a time, until a certain critical value of the velocity is reached, when the coloured streams will suddenly become violently disturbed, and will thereafter mix with the water in the tube, and the colour will permeate the whole tube. The flow

now consists of rapidly intermingling streams, and is known as "turbulent flow." The critical point at which the sharp change from one condition to the other takes place is found to coincide with the point at which the law of resistance to flow changes.

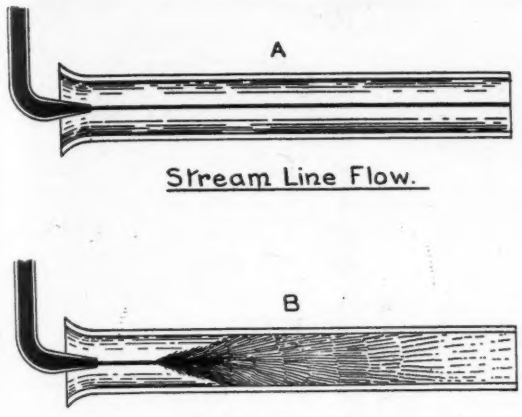


Fig. 2.

The alteration can therefore reasonably be connected with the change in the method of flow.

It can be deduced on theoretical grounds (and the result is confirmed by experiment) that the method of flow of all fluids is similar in any conditions for similar values of the critical fraction $\frac{\rho v L}{\eta}$, where ρ is the density, v the mean velocity and η the viscosity of the fluid, and L the scale of similar linear dimensions of the solid surfaces. For pipes the critical fraction becomes, of course, $\frac{\rho v D}{\eta}$, and it is found that the flow changes from stream-line to turbulent in all fluids—gases as well as liquids—when the value of this fraction in C.G.S. units exceeds about 2000.

The distribution of the velocities of water at different radii from the axis of the pipe is shown in fig. 3. For stream-line flow, the curve is a parabola, and the maximum velocity at the centre of the pipe is twice the mean velocity obtained by dividing the total rate of discharge of the pipe by the cross-sectional area. When

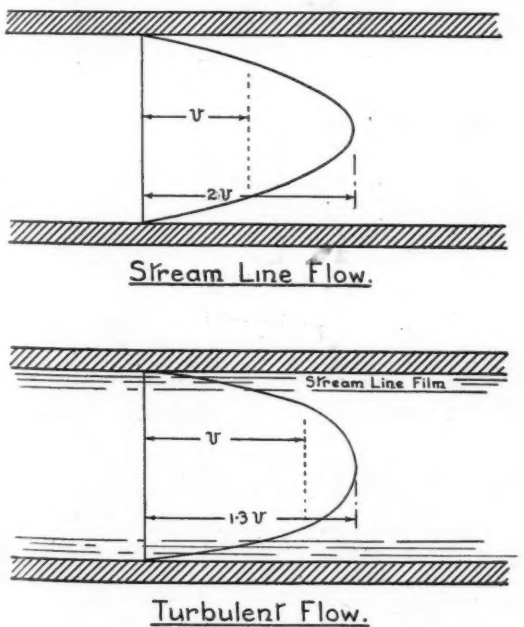


Fig. 3.

turbulent flow occurs, the curve of velocity distribution changes to that shown in the lower diagram. The maximum velocity is now only about 1·3 times the mean. It will be noticed that immediately in contact with the walls of the pipe the fluid has no velocity, and that the velocity increases only slowly as we leave the wall. This suggests that near the walls the velocity may still be small enough to allow of the flow being stream-line in character; and that this is actually the case has recently been experimentally demonstrated by Dr. Stanton at the National Physical Laboratory.

The thickness of this stream-line film can be calculated by making a few simple assumptions which experience has shown to be justified. The result is expressed by the following formula—

$$t = 0{\cdot}55d \left\{1 - \left(1 - \frac{8\eta}{\rho v d}\right)^{\frac{1}{4}}\right\}$$

where ζ is the so-called coefficient of fluid friction which depends on the relative roughness of the surface of the pipe.

There are two methods by which heat can be transmitted through a gas—conduction (which is a relatively slow process) and convection (which is accomplished by actual carriage of heat by the movement of highly-heated molecules of gas from a place of high to a place of lower temperature, and *vice versa* with cool molecules). It will be clear that in the case of the stream-line film, in which the flow takes place in parallel non-intermixing streams, convection will be practically subdued and the whole of the heat be transmitted by conduction, whereas in the turbulent core convection will be the principal means of transfer.

The late Prof. Osborne Reynolds deduced that the curve of distribution of temperature in a flowing gas will be exactly similar in shape to the curve of distribution of velocities; and from this principle, and knowing the thickness of the conducting stream-line film, we can deduce the rate of heat transmission which will take place between the gas and the walls of the pipe along which it flows, as follows—

Resistance to heat flow through stream-line film $R_f = \frac{t_f}{k_f}$

" " " " metal plate $R_m = \frac{t_m}{k_m}$

" convective transfer $R_c = \frac{0{\cdot}45}{\rho v \zeta c}$

" at water side of plate $= R_w$

Total resistance $R = R_f + R_m + R_c + R_w$,

where k_f is thermal conductivity and c the specific heat of the medium concerned.

$$\text{Heat transfer} = \frac{\theta_g - \theta_w}{R}$$

where θ_g and θ_w are the temperatures of the gas and water respectively.

In boilers the resistance of the metal plates is usually very small, and the resistance to heat transfer at the water side of the plate when air-free water is being converted into steam is about 2·5 C.G.S. units. Thus by far the greatest portion of the resistance is due to the stream-line gas film, and accordingly there is a very steep temperature gradient in the gas film adjacent to the plates. The effect of scale or oil adhering to the water side of the plates is greatly to increase the resistance there. This not only reduces considerably the rate of heat transmission, but also alters the temperature gradients, and causes the metal to reach a much higher temperature than would be the case with

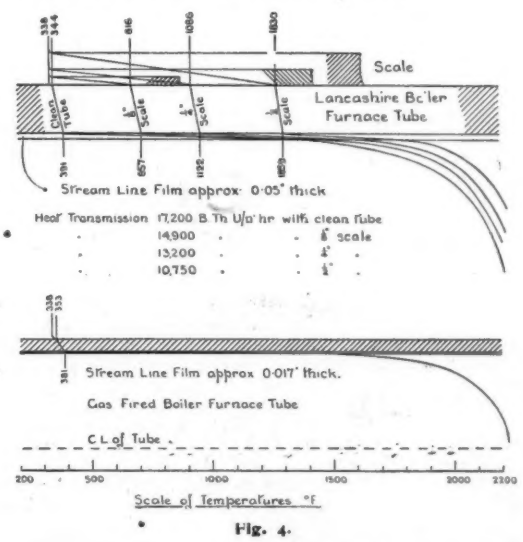

Temperature Gradients in Boiler Flue Gases.
Scale
Lancashire Boiler Furnace Tube
Clean Tube
Stream Line Film approx 0·05" thick
Heat Transmission 17,200 B.Th.U/sq.ft./hr. with clean tube
14,900 . . 1/16" scale
13,200 . . 1/8" .
10,750 . . 1/4" .
Stream Line Film approx 0·017" thick.
Gas Fired Boiler Furnace Tube
C.L. of Tube
200 500 1000 1500 2000 2300
Scale of Temperatures °F

Fig. 4.

clean plates. Fig. 4 shows the temperature gradients in the gas and metal in the case of the fire end of a Lancashire boiler flue, and of the tube of a gas-fired boiler on the Bonecourt principle. The effect of $\frac{1}{16}$ in., $\frac{1}{8}$ in., and $\frac{1}{4}$ in. of scale on the rate of heat transmission and on the plate temperature in the Lancashire boiler flue is also shown. Oil would have a somewhat similar effect, as by preventing actual contact between the plate and the water a corresponding thermal resistance would be produced. The danger of allowing boiler plates to reach high temperatures is well known. In the case of a Lancashire boiler this overheating will cause the bulging of the firebox crown. Such effects are happily now uncommon.

Most stationary boilers are fitted into a brickwork setting, and this has a marked effect on the heat transmission and thermal efficiency of the installation. The brickwork provides heat-absorbing surface, and in this way tends to reduce the efficiency of transmission to the boiler plates themselves. The brickwork also absorbs heat, and in the case of intermittently worked boilers as much as 10 p.ct. of the heat of the fuel may be dissipated in merely raising the temperature of the setting. The full discussion of this problem would take longer than our time permits.

Let us take the following concrete examples, and see what are the actual rates of heat transmission found in practice:

Lancashire Boiler.—8 ft. diameter by 30 ft. long. Grate areas 39 sq ft. Heating surface, 1180 sq. ft. Capacity, 8000 lbs. of steam per hour, from water at 220° Fahr. The average thermal efficiency of such a boiler (not reckoning the economizer) is about 58 p.ct.

Maximum rate of heat transmission .	17,200	B.Th.U./sq. ft. per hour
Minimum " " " .	2,700	" "
Average " " " .	6,840	" "

Babcock and Wilcox Boiler.—Heating surface, 1870 sq. ft. Capacity, 12,000 lbs. of steam per hour from water at 200° Fahr. The average thermal efficiency of this class of boiler (not counting economizer) is about 65 p.ct.

Maximum rate of heat transmission .	20,000	B.Th.U./sq. ft. per hour
Minimum " " " .	2,000	" "
Average " " " .	6,900	" "

Gas-Fired Boiler of Bonecourt Type.—Heating surface, 38·5 sq ft. Capacity, 385 lbs. of steam per hour. Thermal efficiency, 83 p.ct. on gross and 92 p.ct. on net calorific value.

Maximum rate of heat transmission .	42,800	B.Th.U./sq.ft. per hour
Average " " " .	10,070	" "

WHERE THE GAS-FIRED BOILER EXCELS.

The high rate of heat transmission attained in the last-named type of boiler is, of course, rendered possible by the comparatively small tubes and the high gas velocities used, which cause the film of stream-line flow to be very thin, and have a comparatively low thermal resistance. For the same reason the efficiency of heat transfer is correspondingly high. Fig. 5 shows the comparative rates of heat transmission and gas cooling which take place in a Lancashire boiler and in a gas-fired boiler of Bonecourt type.

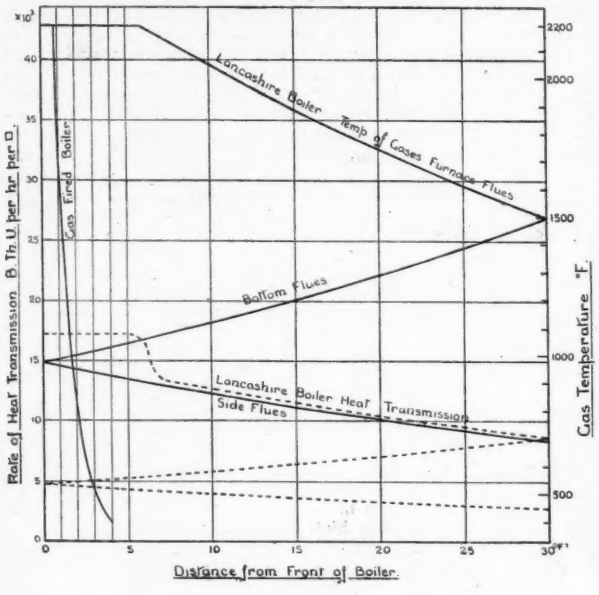
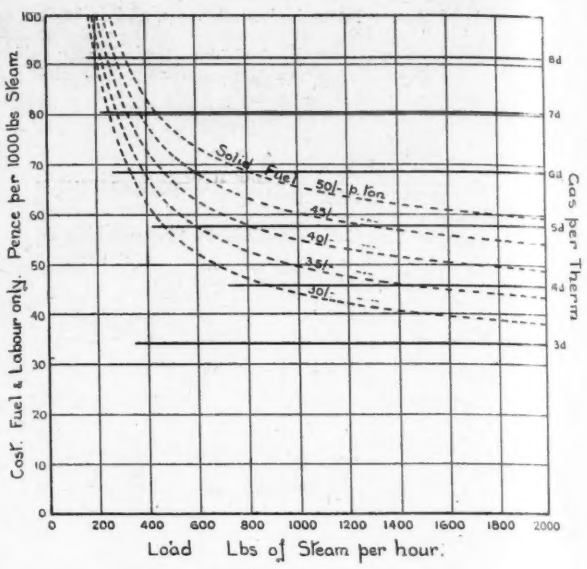


Fig. 5.

The high efficiency possible with gas-fired boilers, together with the perfectly automatic control of fuel and water supplies which can easily be arranged, gives it great advantages for small loads over the common type of solid-fuel fired boiler. The latter occupies a considerable amount of floor space, while its operation demands practically constant attention, and is accompanied by the production of a large amount of dust, dirt and smoke. The mere handling of the solid fuel is in itself a nuisance in many instances. For small installations where the saving in labour charges more than counterbalances the increased cost per therm of gaseous fuel, such boilers are decidedly economical. Fig. 6 has been prepared to show the relative cost in fuel and labour only of the two types of boilers for different rates of both solid and gaseous fuel. The assumption has been made that the solid-fuel boiler will require attention costing 1s. per hour more than the gas-fired boiler, and that an evaporation of five times the weight of fuel will be obtained. The efficiency of the gas-boiler has been taken at 81 p.ct., a figure easily attainable.

It will be seen that in the smaller sizes the gas-boiler is considerably the cheaper, to say nothing of the added advantages



Relative Running Costs of Gas & Solid Fuel Boilers.

Fig. 6.

of cleanliness and speed of working. In the area of all gas undertakings there must be many small steam users to whom such an argument would apply, and I leave this suggestion in the hands of the technical men of the sales side.

Discussion.

The PRESIDENT (Mr. Walter Grogono) said he was sorry they had not given Mr. Booth a whole evening for this paper. It was highly technical, and would be a very difficult paper to discuss. One important point that emerged from it at once was that they had got to keep their boilers very clean. Looking at the diagram shown by the author, it was clear that for the smaller boilers gas-firing had a great future before it. With gas at 4d. per therm, and solid fuel at 30s. per ton, with boilers producing something over 800 lbs. of steam per hour, the lines met. Personally, he would like to hear a lot more about this subject. But probably they would derive more benefit from the paper by studying it quietly at home in print than by discussing it at the moment.

Mr. D. CLEAVE CROSS (Lea Bridge) was anxious to learn something of the relative advantages of Lancashire boiler flues coming round the sides first, and returning at the bottom, compared with the flue gases going into the bottom flue first, and then round the sides. It had been put to him some years ago by an old boiler setter, that there was an added advantage by going round the sides first, and the bottom last, which was a little different from the common practice.

Mr. BOOTH said he was afraid he would have to reply that "it all depends." It depended upon so many things—whether the boiler was being worked with an economizer, the class of fuel that was being used, and particularly the length of flame. But purely from the heat transmission point of view, one would be likely to get a higher thermal efficiency in a boiler test by working the returns down the side flues first. If one had a flame long enough to reach well into the bottom flue, however, the advantages would be with the present practice.

Mr. J. G. JOYCE (Gas Light and Coke Company) said that with the Spencer-Bonecourt boiler the theory was that the higher the flue the better was the efficiency obtained. Was there any limit to the operation of this law? If they went on indefinitely increasing the height of the flue, would the efficiency still go up?

Mr. BOOTH replied that it would, but the increase in efficiency would be in a decreasing ratio. It was the amount of energy one could absorb in friction in the flue that determined the rate of heat transfer. A limit could be reached when the extra cost of the draught would balance the small amount that was added to the efficiency, and then, of course, one would cease increasing the height of the flue.

Mr. D. J. WINSLOW (Lea Bridge) had been interested to hear of the comparative cheapness of the Spencer-Bonecourt boiler for small units. Would the author recommend this type of boiler for intermittent use in churches or buildings of that kind? The 83 p.ct. efficiency seemed a useful figure as against the ordinary coke boiler.

Mr. BOOTH replied that it was not the boiler which would let them down. It would prove quite satisfactory provided the regulation of the gas supply were equally reliable, and that the boiler tubes were free from scale. With hot-water heating as compared with steam production, the scale difficulty might prove serious. At the high rates of heat transmission used in this class of boiler, a failure on the part of the gas regulator might result in the very rapid production of steam, while if scale were allowed to form the tubes would become seriously overheated.

Synthetic Ammonia in Belgium. — The Belgian Ougrée-Marihaye concern is putting down a plant for making synthetic ammonia by the Claude process. The new plant is to start producing in five or six months. For handling the new business the Ougrée-Marihaye concern has formed a new Company entitled Société Belge de l'Azote, who hold the patent rights for the Claude process in Belgium.

"B.C.G.A." DISTRICT CONFERENCE IN YORK.

In conjunction with the Gas Company's Centenary celebrations, a largely attended district conference of the British Commercial Gas Association was held on Thursday in the Tempest Anderson Hall of the York Museum. The President of the conference was Mr. Alfred Procter (the Chairman of the York Gas Company); and he was supported on the platform by the Lord Mayor (Alderman W. Dobbie), Mr. Samuel Tagg, of Preston (President of the Institution of Gas Engineers), Mr. H. Wade Deacon, of Liverpool (President of the British Commercial Gas Association), Mr. F. W. Goodenough (Executive Chairman), Mr. W. M. Mason (Manager), and Mr. H. E. Bloor (the Engineer of the York Gas Company).

The President, in opening the proceedings, remarked that the Lord Mayor of York had been good enough to come and welcome the conference to the city.

A Welcome to York.

The Lord Mayor (Alderman W. Dobbie) said that, on behalf of the Corporation and the citizens of York, he was glad to have this opportunity of extending to the Association a hearty and sincere welcome, and of expressing the hope that it would prove an epoch-making one, some of the honour of which would redound to the credit of the City of York. Apart from the commercial standpoint, he knew that the men there assembled were imbued with the idea of rendering service to the community, by giving them from the production of gas all that was best in connection with light, heat, and power. With this ideal before them, nothing but good could accrue, both to the Association and to the people of the country. The Corporation of York, and he himself as Lord Mayor, recognized in Mr. Bloor (who was regarded by them as the Association's representative) one of the most assiduous and businesslike, as well as one of the most courteous, of men that one could hope to meet.

The President's Opening Address.

The President said his first duty was to thank the Lord Mayor, on behalf of those attending the conference, for his welcome to the ancient city over which he so worthily and successfully presided. He (the President) was glad that the dominant note of the conference was "Public Service," and that the addresses would have special reference to this aspect of their work. The main purpose of the assembly was to mark the completion of a century of public service to the people of York by successive Gas Companies, of which the Company of to-day was the representative and successor. Their centenary had the three-fold quality of an ideal centenary, in that it recorded the completion of a hundred years of service, it marked a definite epoch in the history of the undertaking, and it was to be an inspiration and encouragement for the future. The manufacture and supply of coal gas for public lighting was begun a hundred years ago in York by a small band of public-spirited and courageous pioneers, and from the crude plant and methods of these early times it had steadily and constantly progressed, to be crowned at the end of the century by the installation of a carbonizing plant constructed and equipped according to the latest and most approved methods and principles of carbonization. And yet they might reflect with interest that they were only doing to-day, by elaborate mechanical and chemical processes, the same simple thing that William Murdoch did 132 years ago, when he found by experiment that the gas which could be extracted from coal by heating could be burnt to produce light, and be distributed in pipes for the use and convenience of man. It was he who first put gas to practical use by lighting-up his own house, and they might regard him as the Patron Saint of gas makers. From such a humble beginning had Murdoch's discovery grown to be the great public servant of mankind which they knew it to be to-day, upon which millions of people depended for light and heat, and great industries for the bye-products of distillation. In at least two essentials, from the point of view of the public weal, did their industry possess present and potential advantages over rival methods of lighting and heating derived from coal. Not only was the burning of raw coal wasteful, but it was actually and positively harmful to public health and comfort. In their own city, they knew, unfortunately, what destruction was caused to the public buildings, and more especially to their priceless heritage York Minster, by the action of the sulphurous compounds given off into the air. The use of gas-fires, gas-cookers, and gas water-heaters was steadily growing, and he ventured to think it must increase, as people grew to realize more fully what it meant, not only in preventing pollution of the air, but in the elimination of dirt and the saving of labour in the household.

Looking back, as they naturally did on a centenary occasion, he thought one outstanding feature of the gas industry emerged—namely, the wonderful vitality and capacity for expansion which it contained within itself. It started amid a cloud of prejudice, arising from the Englishman's innate dislike of innovations, and against the opposition of vested interests. After getting a start, it enjoyed more or less a monopoly for many years, until the advent of electricity; and during the period when it had the lighting field to itself no great progress was made in methods of manufacture and use. But with the appearance of a serious rival, the industry received a stimulus which galvanized it into life and activity; and engineers, chemists, and managers set themselves vigorously to work to meet the new competition. There followed inventions and improvements with which all were familiar, and so, not merely in spite of competition, but because of it, the industry had secured and maintained its place in the social system as one of the great public utility services. There was at the present day no industry in which there existed greater activity in the domain of research on the chemical side, greater invention and improvement on the engineering side, and greater vigour, energy, and resourcefulness in distribution and service. For the present, one need only point to the universal experience reported by gas undertakings of expansion of business in all directions; and for the future, the industry was inspired with confidence and faith that there was before it a time of increasing usefulness and prosperity.

The British Commercial Gas Association had its birth twelve years ago, and the first annual conference was held in Manchester under the Presidency of the late Sir Corbet Woodall, who then claimed that the Association was the herald of a new birth in gas policy; and truly had the work of the Association justified this claim. The main purpose was advertising and publicity, and in its activities it combined national publicity with local publicity—both of which were essential to success—and it also gave invaluable aid to the internal organization of undertakings in enlightened principles and by progressive methods. The universal increase of business might be taken as sufficient justification for the existence of the Association, and testimony to its usefulness. It was impossible to appraise adequately the value of the Association and of the National Gas Council, with which it was allied. It was absolutely vital to their interests that there should be a strong central body which could speak with authority and act with effect in the name of the whole industry; and this they had in the National Gas Council. It could truly be said that, without such an organization, the position during the past few years would have been hopeless; and the fact that the industry had emerged from those times of difficulty with such signal success had been due in no small degree to the able, persistent, and courageous leadership of the President, Mr. Milne Watson.

The conference then settled-down to consider the subject of "The Gas Industry as a Public Service," which was introduced by the following addresses by Mr. Bloor and Mr. Goodenough.

GAS AS A PUBLIC SERVICE.

By H. E. Bloor, B.Sc., B.Eng.

I have the honour to address the first Conference of the British Commercial Gas Association to be held in York; and the occasion which brings you here at this time is a memorable one—the celebration of the centenary of the supply of gas in York. It would be impossible to accept a general proposition that "centenaries are worthy to be honoured," and indeed few will quarrel with the assertion of Pitt that "age may become justly contemptible, if the opportunities which it brings have passed away without improvement." That we are justified in bringing to remembrance the work of the pioneers who introduced gas to a dark world, is indeed beyond question. Their work made history and revolutionized urban life and thought. But do we partake of their glory, do we hold high the flag they carried, or do we stand, monumental in decay, awaiting a doom only postponed by the vast inertia which circumstance and the human mind oppose to change?

These questions cannot be answered for us; their solution is for us and for us alone. To us are open two viewpoints, the more comfortable of which at the moment appears to be a lofty point from which the view is open only towards the past. It is a good and gracious view, speaking of past essential service to mankind, and having in foreground prominence the saving of the Empire and civilization during the great war, while in the remote distance twinkle the lights of innumerable lamps which a century ago made possible, for the first time in the history of man, the adequate illumination of streets for safe locomotion. A mighty revolution this, weakened in our picture by the inevitable perspective of time, and calling upon our imagination to enable us to conceive something of the shape it must have presented at a near view. Even at a far distance may be discerned the evidences of homes made brighter, factories more prosperous, human lives made easier, by the advent of gas; and in our picture these make even greater claims on space as the eye travels forward, until immediately beneath the observer they claim almost every inch, so that one can barely discern where gas fails to play a prominent part in life.

Clouds are visible, but their delicate rose colour serves but to add charm and glow to the picture. So fair a prospect of past glory and present usefulness and prosperity might well engage our attention on an appropriate occasion such as that presented by the completion of a hundred years of gas service in an ancient and honourable city.

York glories in a history of two thousand years and in the possession of priceless legacies from the piety and industry of past generations; and the historical sense of a community with such an heritage may well be acute. Dangerous therefore as the seductions of retrospect may be in the domain of business, we feel that for this fleeting moment, and in this place, attention may fitly and properly be directed upon the past; but only for the purpose of drawing encouragement from achievement and guidance from experience. That we may make effective use of our opportunity demands that we take our stand in the midst of another and less smiling landscape, which yet offers the advantage of a clear view not only behind, but around and before. Around us are pitfalls from which we must escape, and dangers we must face with faith and resolution, and before is a great blank which is for us to fill as we may. Let us set about the task with the intention of deserving remembrance at the next centenary of gas as do those whom we honour to-day.

Gas was introduced primarily as a street-lighting agent. We are indebted to our collector, Mr. T. P. Cooper (an antiquarian of note and no mean artist), for two instructive cartoons on view at our exhibition and illustrative of ancient attempts at street lighting. The aggregation of mankind into urban communities has in all ages made plain the value of illumination of public highways. Attempts to provide lighting were many, but always painfully inadequate until gas came on the scene. So clear to all authorities was the value of gas for this purpose, that there was no effective competition, and for street lighting gas held the field, and was indeed so highly esteemed that it had only to be available to be at once adopted. The first York Gas Company accordingly started with the whole of the lighting of the city. The original list of lamps, giving their exact location and the type of burner fitted, is extant. It can be inspected at the exhibition by anyone interested. Demonstration and acceptance of gas as a safe and satisfactory indoor illuminant was a very gradual and prolonged process, for its apparent dangers naturally loomed large in the minds of people entirely unaccustomed to it. While gas therefore may be said to have had an effective monopoly for outside use, it remained in the position of being a competitor of oil and candles for domestic use for many years, and had to demonstrate conclusively its safety and economy, and await the forming of the public mind in this sense, before its general use for indoor lighting and other purposes became universal.

The industry during this period was undoubtedly in a fighting position, and was stimulated to a view of business policy which accords in a striking manner with the enlightened principles of service in business which now prevail. That this was true in York can be at once proved by reference to the advertisement sheets of a very early date exhibited at our Exhibition, and from the earlier of which the following are extracts:

> The increasing demand for gas in private houses has induced the Company to procure a stock of ornamental vases, lustres, &c.
>
> No expense is spared in rendering the gas pure and brilliant.
>
> All work done by the Company will be done under the direction of their Engineers (whose advice will be rendered gratis) and warranted perfect.

It would be difficult to find better words to express our present policy and practice, and I cherish the thought that the views of service and the enthusiasm which our Association have done so much to foster, represent a renaissance rather than a peculiar product of our time. Careful observers at our Exhibition will see instances of "modern" inventions among the antiquities of gas, and free expert advice and guaranteed satisfaction with goods supplied are apparently cases in point.

The Former Freedom from Competition.

There came a time, however, in which gas, having proved to the general public its value and safety for a large variety of purposes, found itself entirely free from effective competition and apparently assured of prosperity for an indefinite period. Such a state of affairs is good for no business; and it is impossible to deny that gas supply passed through a period during which argument about dividend restriction, and price and quality control, absorbed more attention than the really vital question of how to give perfect service at the cheapest possible price to the users of gas. It would be as foolish as it would be unjust to the memories of many pioneers, to paint a picture of unrelieved gloom as regards this point, for there were at all times those who strove with might and main and with success to improve service and to cheapen price. I trust I may, without appearing to be invidious, claim a place for the York Gas Company upon the roll of such undertakings. York was early in the field as regards showrooms and service ideas, hire of gas-cookers and other appliances, the supply of slot meters, maintenance of consumers' lighting burners on low contract terms, and free inspection and regulation of all appliances from time to time—a system which may be described as partial free maintenance. Doubtless for these and cognate reasons York has always been among the cheaper supplies. In this connection I should like to draw attention to the fact, pregnant with meaning to us all, that, while every gas engineer could give instantly the names of almost all the great pioneers on the technical side, and many could provide the names of stalwarts in the parliamentary field, I am persuaded that in the section of our activities which is connoted by the word "service" the names of pioneers would be asked for in vain. Who first offered advice "freely and gratis?" Who first guaranteed appliances perfect? Who first carried stocks of appliances and possessed a showroom? Who first made gas-cookers available to the million by hiring them? Who first supplied cookers free of hire? Who first hired gas-meters? Who first supplied slot meters? Who first gave free maintenance or partial maintenance? Who first gave discounts for power or for large consumption? The list of such queries could be extended; and with regret I admit that to answer them is beyond my power. Yet, were there a great hall consecrated to the service of the gas industry, I could have wished to see these names emblazoned on the walls in equal honour with those of the great inventors and engineers of the past whom we hold in honour. These mortals, gifted with imagination and initiative in the commercial sphere, lived in an age which failed to recognize their title to fame; and as ideas cannot be patented, their names must pass into oblivion, unless, as I hope, this reference should awaken interest, and cause the information to be produced.

Private Enterprise and Municipal Control.

Gas shares with electricity and water the peculiarity of being supplied in some areas by municipalities and in others by private enterprise; and in the vast majority of cases, the municipalities have purchased their undertakings after the commercial success of the latter had become assured under private management. For this reason the purchase of gas undertakings did not set-in as a widespread policy until a comparatively late date. The position of a gas committee relative to consumers of gas differs somewhat from that of the board of directors of a gas company; for a gas committee undertaking exists for the purpose of benefiting the consumers of gas, while directors exist as such for the purpose of safeguarding the interests of their undertakings. To municipalities the supply of cheap gas of proper quality is a primary duty, which is in general performed with enthusiasm only tempered in some cases by the demands of finance committees. I believe that so far as those members of councils who are gas committee members are concerned, opinion has moved during the past few years strongly towards the view that profits should not be used for any other purpose than reducing the price of gas. It is greatly to be hoped that this view will secure the acceptance of an increasing number of councils, and ultimately become universal. The policy of increasing price for rate aid hits the gas consumer twice, for it reduces consumption and thus presents an obstacle to further price reduction. All consumers pay more than they need at any given moment, and are handicapped as regards further reductions in price. In particular cases consumers are also affected in another way, should they desire to use gas for certain purposes and be unable to do so because of the price. This is admittedly a matter of high policy, and I do not wish to labour the point. Rather would I dwell upon the striking growth of a sound commercial policy among municipalities administering gas-works.

A view which is clearly possible is that gas is a necessity of urban life, the undertaking is there to supply gas to all who want it, and it is no part of the duty of the gas committee to induce people to use gas if they do not want it. That such opinion found wide acceptance at one time is beyond question; but it is equally certain that at the present time the vast majority of gas committees take a different view of their responsibilities. In his remarkable presidential address to the first general meeting of this Association Sir Corbet Woodall laid it down as the duty of gas administrators:

> "Whether you are a sliding-scale company, or a maximum-dividend company, or a municipal undertaking, the public rights you possess impose upon you a public duty—that of supplying gas in your district at the lowest possible price consonant with your other obligations."

This view now finds almost universal acceptance, and among municipal undertakings are to be found many of the most advanced and progressive—and even daring—managements as regards cultivation of new business and conservation of existing load by the method of service. The managements of such undertakings have clearly adopted as their guiding principle that the undertakings must be administered on commercial lines; and we are assured that they are right, for their primary duty of supplying the cheapest possible gas cannot be performed unless the maximum possible consumption per head of population is attained. In short, profits are not all made in the retort-house. Thus we arrive at the conclusion that an undertaking existing solely for service must adopt an active policy of commercial development.

Let us glance at the position from the point of view of private ownership. Directors are required to have a financial stake in their undertakings, and are appointed by shareholders for the specific object of safeguarding their interests; and however public-spirited directors may be, this must remain a primary duty. To safeguard the interests of capital is a high and responsible duty to society, and nothing about which any qualms whatsoever need be experienced by the highest minded. Capital is that which enables a man to exist above a very low level of material well-being. Those who guard it wisely and well are performing a service to mankind of the same order as that of the staunch sentry guarding the winter stores from the spendthrift and the glutton. If the self-denial which creates capital fails of reasonable reward, it will cease to be exercised. If the ability, initiative,

and imagination expressed in the use of capital, which have provided for mankind all those amenities which make modern life so infinitely full and luxurious as compared with past ages, fail of their reward, these qualities again will fail to be exercised. Those of us, therefore, whose work in life is to safeguard capital must needs take a lofty view of our duties, not being ashamed to confess our singleness of aim and purpose, but, on the contrary, must be proud of it.

The Fulfilling of a High Aim.

How best is our purpose to be achieved? The full answer is not to be found in a phrase, nor could it be condensed into one volume, for an infinity of variety attaches to the circumstances of gas undertakings, and the working-out of the same theory may involve apparently opposing policies in adjoining concerns. But the broad reply may be achieved, and in little space. Not natural science only has achievements to its credit in the past hundred years. There is a science of business; and one may at once put upon record such accepted conclusions as follow.

We must sell all the gas, for all the purposes, to all the people, possible. To achieve these results we must produce and distribute gas of the quality most suited to our districts, at the lowest possible price, and with the maximum possible purity and uniformity of quality; and we must provide and promote by the best-known means the use by our customers of appliances most suited to their requirements as regards efficiency and safety, and in conformity with the highest standard of taste in design. So far we are on safe ground. But we must go farther. It is not sufficient that we deserve success. We must achieve it. Be our efforts as hard, and our desire to give satisfactory service as intense, as the most severe critic could require, we shall find that within the Englishman's house, which is (or should I say was?) his castle, all our work may be nullified. Our gas and our appliances, products of an infinity of labour and science, may be improperly used, or allowed to get in bad condition; and our reputation may be most in danger when we are most conscious of deserving praise.

"The satisfied customer is the best advertisement." "One dissatisfied consumer can do more harm than ten satisfied persons will do good." These sayings and their implications are as soundly based as are our accepted conclusions; yet they force us into compromise, for to accept them involves that we shall take up the position that we sell, not gas, but gas service. Light, not in theory, but on the page; heat, not expended only, but felt; power, not merely potential, but realized. Our conception of the best policy for conserving the interests of our shareholders thus compels us to sacrifice something as regards price, and expend money on service. We must accept a reasonable return upon our capital, and must even be prepared to sacrifice some of the possible immediate return, with the object of widening the basis of our business and securing with the service we render the satisfaction of our consumers, and thus safeguarding our interests at long range, when short-sighted expediency may seductively offer present gain at the price of future security.

The Need for a Correct Theory.

We have come in a full circle—for we have found that if we set out for service alone we come to commercial exploitation, and aiming at private gain we arrive at service and sacrifice. I have indicated that a variety of policies may be exhibited by a widespread industry like ours, yet each may be the local expression of a universal theory. I plead here for a right theory. Much scope remains for discussion—which must necessarily be conducted with privacy—of circumstance and detail; and I trust that our Association will in future provide more opportunities than in the past for free and intimate debate on matters of policy—such debate as is required no less in the domain of commerce and salesmanship than in the sphere of technics.

It is not my intention on this occasion to attempt to fill in details where I would rather deal with broad principles, but I may perhaps remind you that in York we have adopted a system of house-to-house inspection, with the object of assuring so far as is humanly possible that our consumers shall not suffer by inexperience or inability to maintain their appliances in perfect order. Starting the system experimentally, we now have a highly trained staff of whose work an exact record is kept. That the work fills a definite want, and is appreciated by our consumers, is now beyond question; and if any would like to see the records to which I have referred, I should be delighted to place them at their disposal. We also believe in educating the youth of the city in the right understanding and use of gas appliances of all kinds; and the wonderful essays which are on show at our Exhibition should be perused by all interested in the educational side of gas development.

There are not wanting the interested, the unintelligent, and the misinformed, who assert that the industry we serve, so instinct with life and vigour, so throbbing with scientific development and invention on the technical side, and so full of the consciousness of the will and the power to serve essential needs of the community as we know it to be, has reached its zenith. Looking out on the commencement of another century of usefulness, let us go forward in no spirit of complacency at a century of achievement, or on the other hand with gloomy forebodings, but rather in a spirit of modest but profound pride in our past, thankfulness in our present strength, and confidence in our future. May we hope that our successors, in their turn, shall see our time as but a step in the progress of a greater gas industry than we know, and one still vital to serve.

The President, calling upon Mr. Goodenough, acknowledged their great indebtedness to him in connection with the organization of this conference.

MR. GOODENOUGH ON THE SCIENCE OF BUSINESS.

Mr. F. W. Goodenough said: First of all, may I, on behalf of the Executive of the Association I have the honour to represent, thank the Lord Mayor for the very cordial terms of his welcome to this ancient and yet modern city in which we all find ourselves with so much pleasure. We thank also very heartily the Chairman and Directors of the York Gas Company for the hospitality they have extended to the Association, for the arrangements they have made for this meeting, and for the most delightful function at which we were present last night. We thank Mr. Bloor, too, for all that he has done to make this meeting possible and so successful. We further desire to congratulate York and the Gas Company upon the attainment of the latter's centenary, and we wish the Company "Many happy returns of the day." We see no more signs of decay, monumental or otherwise, in the York Gas Company than we do in the industry of which it forms part. We see, on the other hand, all signs of success achieved because of success deserved. We congratulate the Board of the Company upon the policy they have adopted, and upon the persons they have appointed for the carrying-out of this policy.

A "Going" Industry.

The address to which we have just listened from Mr. Bloor made us all feel, as many of us have felt for a long time, that York is very happy in its management. This we felt also when we were listening to the interesting and thoughtful remarks with which the Chairman of the Company began the proceedings. As he said, and as Mr. Bloor said, the gas industry, contrary to what some of its interested critics would like to suggest, is not "going," except in the sense that it is "going strong"—it is going stronger than ever. We are not among the "has beens;" we are not going to be among the "has beens." We are among the "to be's." As the Chairman has pointed out, there is plenty of room for both gas and electricity in the service of the community. We occupy a bigger field than ever before, and our industry is expanding more rapidly than ever before, so that there is no reason for other than optimism. We know that we are not going to be wiped off the map, in spite of anything anybody (whose wish may be father to the thought) may say. Why is it we have such confidence in our position to-day, and such confidence in the future? Because of such addresses as that we have listened to from Mr. Bloor this morning, and because we know the industry as a whole believes in the principles Mr. Bloor has enunciated, and which have been recognized in recent years more particularly—because in increasing measure it is being realised that there is a science of business, as he expressed it, to be studied as carefully and as thoroughly as any of the other sciences of which we talk more familiarly, and that business, when treated as a science, and when studied also as a philosophy, is as honourable a calling in life as that of any profession. We have been sneered at sometimes as being a "nation of shopkeepers." There is no reason why we should not make shopkeeping as honourable as any other calling; and it is in the recognition of the fact that business is service that we find our way to make it an honourable calling. We have abandoned the old idea expressed in the phrase "Business is business," which is another way of saying you would do in business what you would regard as dishonourable in your private life—a principle which has led to more ultimate disaster in business than almost anything else.

He Profits Most Who Serves Best.

Business is but one phase of life, and is governed by the same law of success as governs life as a whole—namely, he profits most in the truest sense who serves best. Service to others is the golden rule of life. We in the gas industry have abandoned, as have those in many other industries, the old Latin principle *Caveat emptor*—"Let the buyer beware." We believe he who studies the interests of the buyer is sure to be the most profitable seller. "He profits most who serves best," with the accent on the "serves" more than on the "profits," on our duties rather than on our rights. Mr. Bloor spoke of its being the duty of those administering industrial undertakings to safeguard the interests of capital, and he showed that he interpreted this word "safeguard" in the greatest and truest sense. It is in the recognition of duties as well as rights that we shall hope to find the solution of many industrial problems to-day. We who represent capital have our duties to labour; labour has its duties to capital. Both have their rights; but we are all too much inclined to lay emphasis on our own rights, and to forget our duties. It is because the gas industry is more and more recognizing its duties to its employees and to its consumers that we feel so much confidence in the future. In regard to the public we serve, we believe emphatically in the policy of the square deal. "Square," if I may put it so, with for its four sides—fair quantity, quality, price, and profit—the "p's" and "q's" which we all have to mind. Quantity guaranteed by independent measurement; quality guaranteed by independent tests; price and profit governed by reasonable legislation. We hope, and believe, we are honest and honourable men in the gas industry; but thanks to the legislation to which

we have been parties, and in many cases have initiated, we could not be dishonest even if we wished. So we can always look the public in the face, and know we are giving them a square deal; but having provided that, we must recognize (and as Mr. Bloor has said, for many years now we have recognized in the industry) that we have not merely to supply gas, we have got to sell gas, and to sell service with gas.

The Gas Industry and Employment.

The "B.C.G.A." has from the first stood for the policy of selling all the gas to everyone that everyone can use with advantage to himself or to herself. We exist to organize and assist the publicity side of the gas industry; and we believe that publicity is a creative force which makes for greater consumption of gas, a higher standard of civilization in our communities, and greater employment. The gas industry has the proud record of being one, at any rate, of the industries that has done nothing to aggravate, but has done much to ameliorate, the problem of unemployment in the last few years. I think we can all say we are employing more men than we ever in our history employed before. We have the pleasure of knowing that there are no men walking the streets unemployed because of slackness in the gas industry; and we believe that the more we study and perfect publicity for the industry, the more we shall increase employment in that industry without decreasing it elsewhere. We shall increase the standard of comfort in the homes of the country, as the slot-meter has already done in over 4 million working-class dwellings; and in this way we shall be able to serve the community and serve ourselves, with profit to all. The consumer will get lower prices and greater efficiency; the shareholder will enjoy more security of profit; and labour will have more certain and increased employment. We believe that money spent on publicity is an investment, a most profitable investment, and not an expenditure for which either producer or consumer has to pay.

Wembley.

With regard to the exhibition which opens on April 23 at Wembley, this is going to be the greatest Empire advertisement and investment that has ever been undertaken; and I believe it is going to be the greatest investment in publicity for the gas industry that we have ever seen. The industry has shown a wonderful appreciation of the opportunity of Wembley. We have had a remarkable—though not yet a sufficient—response to our appeal for the necessary funds to make the gas exhibit fully worthy of the occasion. The exhibition is going to be the most marvellous one that any of us has ever seen or is ever likely to see. The gas industry is going to be represented in the very centre of the exhibition; and we are proud of the fact. We are, indeed, proud of our industry as a whole. We have faith in it; we have hope based on our experience; and we have charity for our detractors, because we know their suggestion—that the gas industry is a moribund industry—is going to be entirely blown to the winds in the course of the next few months.

Appreciation.

Mr. Harold E. Copp (Hull), proposing a hearty vote of thanks to Mr. Bloor and Mr. Goodenough, pointed out that the Company he served (the British Gas Light Company) were also this year celebrating their centenary. They all regarded Mr. Bloor as one of the "live wires" of the industry to-day, and they were very glad of having an opportunity of coming to York to see what he had done. One of the chief objects of the Association was to convey to the public the wonderful possibilities of gas. It was very satisfactory to note that, as a result of these conferences and the other work of the "B.C.G.A.," the public were beginning properly to appreciate the advantages of gas. Mr. Goodenough, whose name was a household word in connection with gas, had done splendid service in this direction, and really he wondered what the position of the industry would have been to-day had it not been for these services. He (Mr. Copp) was one of those who had great faith in the future of gas. The more one thought about the matter, the more convinced one became that this future was assured. This future of gas must be dependent upon its cheapness. This was one of the first essentials. He had been astonished to notice so little decay in the priceless historical buildings of York, and for this thanks were due to the Gas Company, who had so largely introduced the use of gas-fires and other apparatus.

Cheap Gas and the Rates.

Mr. Charles Wood (Bradford), in seconding the vote, said he had heard Mr. Bloor many times speak on this subject, but that day he had surpassed any previous effort. All those present must be in agreement with what had been said; but though the address might be a talk to the converted, he hoped that it would strengthen their views—and particularly that it would strengthen the hands of councillors whose municipalities needed converting to the policy of selling gas at the cheapest possible rate. He hoped it would some day be rendered impossible for money taken from gas consumers to be used for the relief of the rates. It was wrong in every way. It might, however, need a little pressure from a progressive Government before this desirable position could be reached.

Still Further Education Needed.

Mr. Robert Watson (Doncaster) agreed that these admirable addresses upon the services which the gas industry could render, and was rendering, to the community at large were worthy of careful study. While they as gas engineers knew full well the uses to which gas could be profitably put, the general public did not yet fully realize all the benefits that gas could confer upon them. Many people, of course, did realize this, and were taking increasing advantage of their knowledge. This was proved by the largely augmented consumptions which undertakings in different parts of the country were experiencing—which increases were being obtained at a time of keener competition by electricity, of shorter shop and factory hours, and of greater efficiency of the appliances through which gas was consumed. For a unit of service, less gas than formerly was being employed. Only a month ago, in his own town, he was giving a lecture upon the history and uses of gas; and he was astounded to find in the discussion how many things were not known to the ordinary gas user. Further evidence of this need for education was to be found in the gas consumed per meter in the case of companies throughout the country as compared with the use per meter with municipal undertakings. He believed he was right in saying that the gas companies were selling per meter something like 5000 or 6000 c.ft. per annum more than municipal authorities. This, to his mind, rather pointed to the fact that the public in the case of the municipally-owned undertakings had not been properly educated to the uses of gas, and so had not realized what services they could get out of it, in the same way that gas companies' consumers had done. The companies were securing their increases by continually educating their public, as was being done in York, and keeping in touch with the consumers by means of excellent showrooms and attractive advertising. Of course, the question of municipal trading had been a bugbear with municipalities; and this had made it difficult for them to do everything that companies were doing. They were, however, beginning now to establish showrooms and to push business without respect to the interests of particular individuals in the town, with the result that their returns were increasing, and the gas industry as a whole must be benefiting. By a greater use of gas, the overhead charges became less, and it was possible to sell at a lower rate; and the more gas was used the quicker they would achieve what all desired to see—a purer atmosphere.

York's Valuable Collection of Documents.

Mr. C. S. Shapley (Leeds) said he had thoroughly enjoyed the scholarly address of Mr. Bloor, of whom he had the highest appreciation. With regard to the uses of gas in York, he had been particularly pleased with the wonderful exhibition Mr. Bloor had provided. The records there had interested him beyond description, for they had been so remarkably well preserved. Very few gas companies could have such a wonderful collection. Mr. Goodenough's address was on a par with everything he had ever said. It was always a pleasure to hear him speak.

Acknowledgments.

The President, on behalf of his colleagues and himself, wished to say a word in support of this resolution. They were very grateful to Mr. Goodenough for organizing the conference, and for coming down from London to attend it. With regard to Mr. Bloor, he felt that day they had reason to be—and they were—very proud of their Engineer. They had listened to a remarkable address from him. It was full of inspiration and encouragement to the industry.

Mr. Goodenough, in acknowledgment, said what he had done had been a pleasure to him.

Mr. Bloor remarked that it was a great joy to him to see that so many members of the gas industry whose friendship he desired, and whom he admired, had, some of them at great personal inconvenience, come to York to support his Company in their celebrations. It was a remarkable fact in the life of their industry that they were all so ready to help each other; and he felt that many of those present were there because they definitely desired to help a colleague in carrying out the duty of worthily celebrating a centenary. It was one of the great traditions of the industry, this willingness to help. They were out to assist each other, and this Association was one of those efforts. He claimed little of the praise for the exhibition. Mr. Hardcastle, Mr. Cooper, and other members of the staff, had put much labour and thought into it, and they had had the priceless advantage of being loaned the collections of the South Metropolitan Gas Company and other firms and persons.

Mr. W. M. Mason proposed a vote of thanks to Mr. Procter for presiding over the conference, and to his Board and Mr. Bloor for their co-operation. He said in all sincerity that no more fitting place in which to think of service could have been chosen in the whole country than York—a city dominated by a wonderful memorial to service of the highest kind. The gas industry had never more "kick" in it than to-day, and never better prospects for the future than now lay before it.

The meeting having expressed cordial agreement with the resolution, there was an adjournment for the Gas Company's Centenary Luncheon, reference to which is made on another page of this issue.

The All-Gas House.

In the afternoon, a number of those who had taken part in the conference earlier in the day visited the Joseph Rowntree Village Trust Estate, New Earswick, some two miles away, to which they were welcomed by Mr. W. J. Swain, M.Inst.Struct.E., who

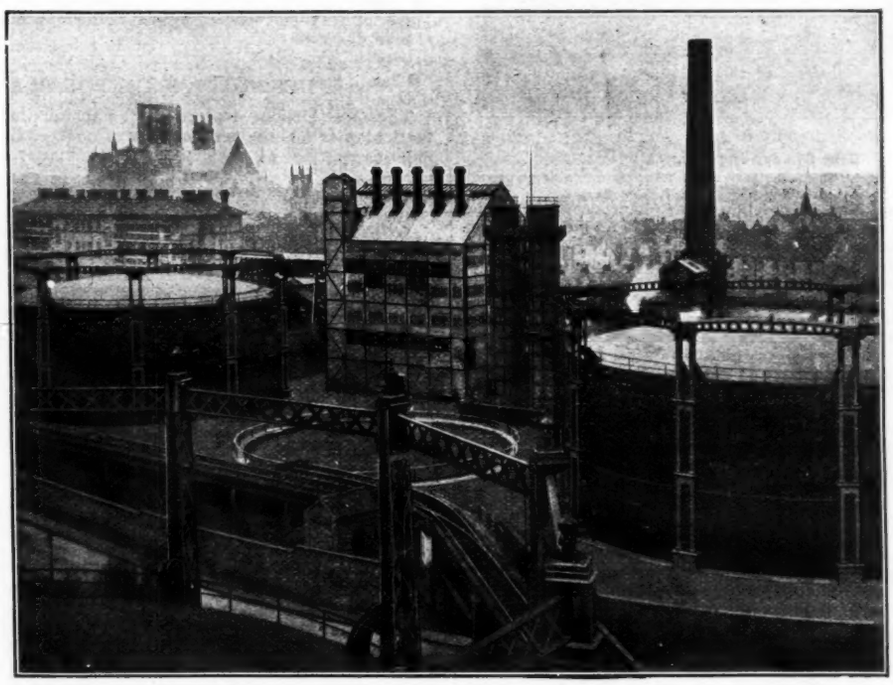
had prepared for the occasion a short paper on the subject of "The All-Gas House." This was particularly appropriate, because, as was pointed out by the author, though there are no "all-gas" houses on the estate, there are many "almost all-gas" houses. In fact, all the cottages are now built with only one fire—that is, in the living room. "Before the war," said Mr. Swain, "we could not get any of our Yorkshire women to give up their Yorkshire ranges for cooking; but during those times of stress, when Yorkshire ranges were not forthcoming, we installed gas-cookers and gas-coppers. At first there was a kick; but very soon, when Mother found the saving in time, more leisure, and better results, she passed on the word to her neighbours, and we were kept busy taking out the ranges and installing gas. We now never build without gas-cookers, gas-coppers, and gas-fires in two of the bedrooms. This is done at the request of the tenants; but it does not help very materially in the cost of house construction, as the one coal-fire necessitates the provision of the usual large smoke flue, with its attendant mass of brickwork and foundations."

Later on in his paper, the author said: "I am not here to teach you the usages of gas, or to state what class of fitting should be installed; that is a matter for your industry to look to. But I do say that many of the obsolete patterns of gas-fires should be withdrawn. Faulty, smelly contraptions have more to do with retarding the all-gas house than anything else. Also a general inspection of all gas appliances should be undertaken by the gas companies, and the women taught to clean and use them properly. I am concerned solely in the construction of the house; and I find that if you would build an all-gas house, there would be a saving in bricks for a cottage of the non-parlour type and size instituted by the Housing Commissioners of about 3500 bricks. This, together with hearths, fireplaces, &c, shows a net saving in labour and material of £36 per cottage at present-day prices. Of course, the saving would be greater for a larger house with sitting room and more than three bedrooms. Gas-fires only require small flues, and as most of the modern houses are now built with cavity walls, as should be insisted upon by all local authorities, there is no difficulty in constructing such flues within the thickness of the wall, as can be seen in our cottages now under construction. There would be an additional floor space of 38 sq.ft."

GLOVER-WEST VERTICALS AT YORK.

Inauguration Ceremony.

READERS will already be aware that included in the centenary celebrations of the York Gas Company last week was the official opening of a new installation of Glover-West continuous vertical retorts—which function followed upon a luncheon in the world-famed Assembly Rooms. The large party of visitors having been conveyed to the works, in charge of Mr. H. E. Bloor (the Engineer, Manager, and Secretary), the new plant was thrown open for inspection, and formally inaugurated—retorts being charged (under the guidance of Alderman Fred. J. West) by Mrs. Procter, Mrs. Bloor, Mr. Alfred Procter (the Chairman of the Company), and Mr. J. J. Hunt (the Vice-Chairman). Many of the best possible judges were present at the inspection, and much satisfaction was expressed with what was to be seen. It was felt that cordial congratulations were due to the York Gas Company, Mr. Bloor, and West's Gas Improvement Company. A few notes (reprinted from the souvenir book) regarding the new installation of verticals appear on p. 36, and a short technical description of the plant concludes this article.



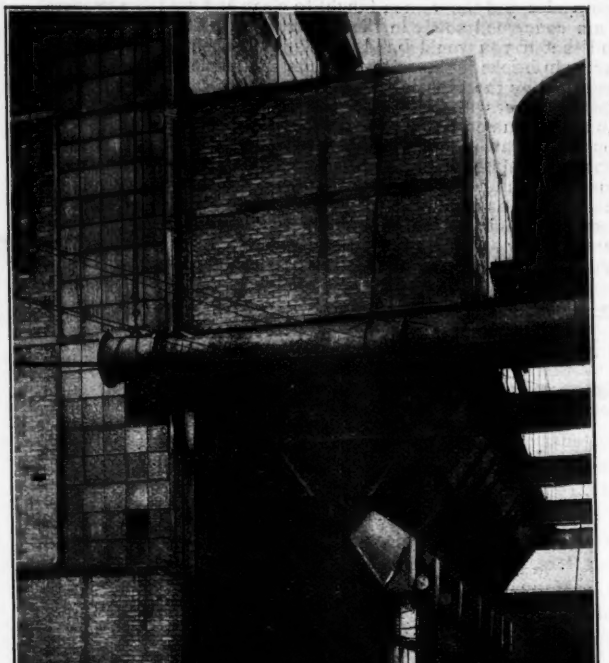
GENERAL VIEW, SHOWING THE VERTICAL RETORT HOUSE.—YORK MINSTER IN THE DISTANCE.

The Luncheon.

On the invitation of the Chairman and Directors of the York Gas Company, a party numbering about 180 sat down to luncheon in the Assembly Rooms, prior to the official opening of the new vertical retort installation. Mr. ALFRED PROCTER (the Chairman of the Gas Company), presided, and there sat with him at the top table the Lord Mayor (Alderman W. Dobbie), the Lady Mayoress, Mr. C. S. Shapley, Councillor F. Wilkinson, the Rev. Canon Perkins, Mr. James Melrose, Mr. J. J. Hunt, Councillor W. Cunliffe, Mr. C. Wood, Mrs. Procter, Sir William Kay, Mr. H. Wade Deacon, Mr. Gibson, Mr. James Paterson, Lady Forster Todd, Mr. H. E. Bloor, Alderman F. J. West, Alderman Shipley, Councillor G. Walker, Mr. F. P. Tarratt, Mrs. H. E. Bloor, Mr. George Wilson, and Sir W. A. Forster Todd. The Chairman having submitted the Loyal Toast,

Mr. JOHN J. HUNT, J.P., C.C. (the Vice-Chairman of the Gas Company), proposed "The Institution of Gas Engineers." He said that to-morrow they would celebrate the centenary of the York Gas Company, and engage in a conference having relation to the commercial side of the gas industry. This day was the day of the engineer, for they were meeting preparatory to visiting the works of the Company and formally opening an installation of vertical gas-retorts of the latest pattern. He was informed that the Institution of Gas Engineers, which had done so much to further technical developments in the gas industry, was, like the York Gas Company, a product of the fusion of two competing Associations. It was well that the whole body of gas engineers should be associated together in one Institution, not only because of the internal harmony such a state of affairs indicated, but

because the value of such associations grew so greatly with numerical strength. In ancient days, when knowledge of natural science and engineering was kept as secret as possible, progress was very slow; but with such an Institution as that which they were now toasting, there was a platform always ready upon which gas engineers might



Coke Storage Hoppers.

describe and explain to their fellows any improvements in the machinery or plant, or the operation of gas-works. As the old days of secrecy had gone, and had been replaced by the spirit of co-operation and mutual assistance, this platform had been constantly used, with results of the greatest importance to the gas industry. Any fresh knowledge was immediately disseminated among the whole body of gas engineers. A notable development of recent years which had interested him very much was the invaluable research work which had been conducted by the Gas Investigation Committee and the Institution of Gas Engineers, in collaboration with the Leeds University. In this connection, he might say that some of those they would have been pleased to have with them were at present engaged at Leeds in dedicating, with due ceremonial, to the use of the Fuel Department of the Leeds University, a magnificent memorial to the late Sir Corbet Woodall. They believed that the gas plant which was being dedicated that day would greatly benefit the students, and through them the gas industry in the future. It was very interesting to him to see in the Company's exhibition a model of a gas plant made in 1868 which he was informed anticipated in some remarkable respects even the ultra-modern plant which had just been installed at the York Gas Works, embodying the idea of carbonizing coal in retorts, allowing the coke to fall into a steaming chamber, and then steaming the hot coke. He believed this was practically what they were going to do in their new vertical retorts. He hoped this model, and the rest of the exhibition, would prove of great interest to those who had time to pay a visit to the Gas Company's showrooms during their stay in York. As Chairman of the Works Committee of the Board, it gave him very great pleasure to invite those present to go down to the works after luncheon, and inspect the new installation. The Company believed they had got a good plant, and one which would give an excellent account of itself in the future—not only in effecting economies, but in removing from the works the complaint which had been made about them, that they polluted the atmosphere. One of the biggest claims for gas was that it enabled the atmosphere of towns to be improved by prevention of smoke; and the Company were very anxious indeed to carry on their own operations without making any appreciable amount of smoke. They hoped that the new plant would enable them to do this. They felt that the technical development which had resulted in their being in a position to obtain such a plant had been largely assisted by the Institution of Gas Engineers, of which they had with them that day many distinguished representatives. He coupled with the toast the name of Mr. James Paterson, Vice-President of the Institution, who was the representative of generations of gas engineers famed throughout the industry.

Mr. JAMES PATERSON, M.A., after acknowledging the generous manner in which the toast had been proposed and received, remarked that reference had been made to the fact that many who would otherwise have been present were taking part in a function at Leeds University. Among them was Mr. Samuel Tagg, the President of the Institution of Gas Engineers, who was attending the dedication of the large and valuable plant which had been presented to the Leeds University in memory of the late Sir Corbet Woodall. The point which he thought they emphasized as much as anything in regard to the Institution of Gas Engineers was that it formed the centre from which, and to which, all progress in the manufacture of gas radiated or emanated. The Institution, as many of those present were aware, was the ultimate outcome of the old British Association of Gas Managers, which was started, he believed, somewhere about the middle of the last century. The Institution, by their operations, provided mental food or pabulum of a very serious kind, and the many men who flocked to London to the annual meetings found in the business programme more than sufficient to occupy them. It was at the annual meeting of the Institution of Gas Engineers that the real progress of the gas industry was represented. Discussions took place, and from these discussions followed on through the ensuing year the progress of the industry—for the industry was one of progress. One had only to look at the magnificent exhibition arranged by their friend Mr. Bloor to realize what progress had been made in gas appliances; and the same thing applied to the processes of manufacture. But the Institution, as the proposer of the toast had said, had another line of activity which was at least as important as the meetings for the reading and discussion of papers—and that was the fostering and guidance of research. The "sinews of war" for this research were provided by the gas undertakings throughout the country; but the administration of these moneys was in the hands of the Institution, and he ventured to suggest that it was only those who, like himself, had been privileged to be associated with the higher councils of the Institution who knew the tremendous amount of work that was done in looking after this research. They had a staff of chemists engaged in investigating different problems day by day throughout the year. He did, therefore, think the Institution could claim to be bearing their part in the laying-down of the lines on which the research work should proceed. There was, too, a further line of activity which the Institution had undertaken, and that was the regulation and co-ordination of the education of gas engineers. This was a matter upon which many of them had varied opinions; but he thought they were all agreed that it was time, and full time, that attention was given to the real training of the gas engineer of the future. ["Hear, hear."] In his view, this training had lacked a good deal in the past. It had been apt to be a little haphazard. Under this scheme, however, the education would be arranged on carefully thought-out lines, so that ultimately the gas-engineering profession of this country would more fully than ever justify its position.

Mr. H. WADE DEACON proposed a vote of thanks to the Chairman for presiding; and the CHAIRMAN submitted the health of the Lord Mayor of York—acknowledging his kindness in placing the Guildhall at their disposal

DESCRIPTION OF THE PLANT.

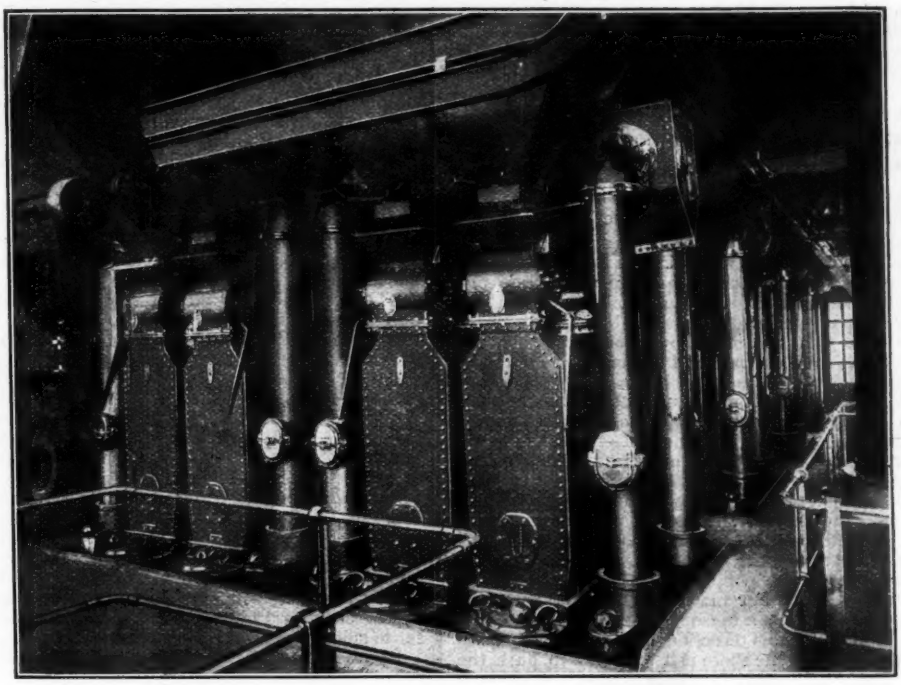
The most striking feature of the installation of Glover-West vertical retorts is the very small area covered by a plant with the daily capacity of 2½ million c.ft. As a matter of fact, it was the introduction of the new model Glover-West vertical retort which enabled this extension to be made so satisfactorily on the ground available. This new model has now been described several times in our pages, but it may be well to repeat here that it consists in the Glover-West vertical retort of the usual elliptical cross-section, with the bottom portion opening out more or less abruptly into a circular section. By this simple expedient, not only is a greatly enlarged area of coke presented to the superheated steam for the simultaneous production of water-gas in the retort, but the efficiency of the whole system is considerably increased.

The retort-bench at York is fully up-to-date, too, with other developments which have been going on in the Glover-West system. Insulation, utilization of waste-heat, improved fittings generally, the new type of producer furnace, and improvements in the arrangements of flues within the setting, have all conduced to a most efficient gas-making plant.

The new large grate producer is a development of the open step-grate producer which was introduced with the Glover-West system almost at the outset of its career. All this time efforts have been made to eliminate, or at least reduce to the minimum, the formation of clinker, and to render the removal of ash from the fire as easy as possible. Clinkering is perhaps the one piece of arduous labour left in the retort-house, and to reduce it to a mere removal of ashes—occupying some half-hour per shift—is an achievement. The secrets are the provision of an ample grate area, resulting in a slow speed of primary air through the fuel bed and a consequent low temperature in the same, and the disposition of the grate in relation to the flare bed so that the zone of maximum temperature is kept low in the fuel bed and the formation of clinker (which is, after all, unavoidable with fusible ash) takes place in positions from which it is easy to dislodge it.

The steam for use in the retorts is generated in waste-heat boilers of the natural-draught water-tube type. Each boiler is fitted with automatic feed control and high and low water alarms. Heat thus recovered from the waste gases returns to the retorts *via* the medium of superheated steam. No attempt, however, is made to raise large volumes of steam; each boiler raises just sufficient for the maximum steaming requirements of the setting to which it is attached.

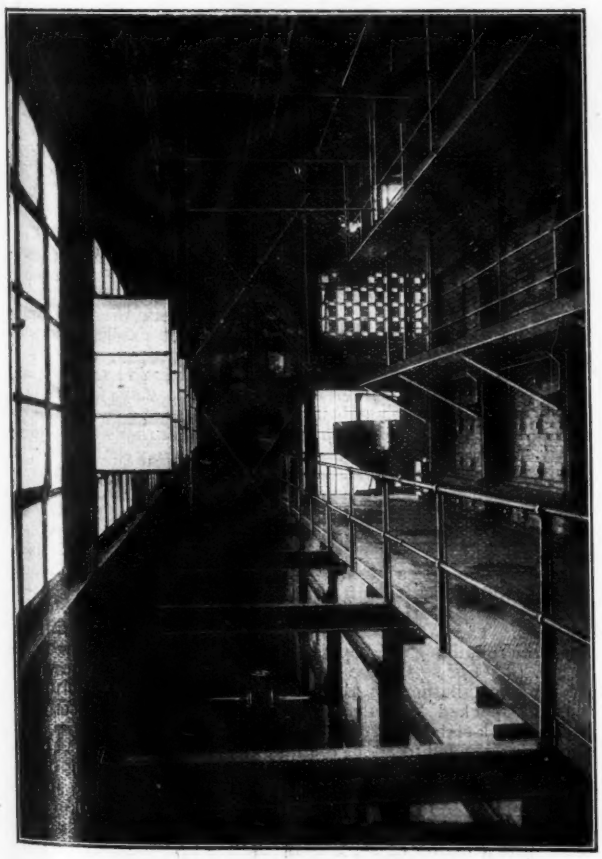
The next striking feature of the plant is the handling of coal and coke. Both these materials are handled by one line of the recently introduced West lip-bucket conveyor. By this means coal is taken direct from the breaker, arranged in a pit below the coal-store floor, to the 48-hour coal bunkers above the retorts,



FEED HOPPERS, ASCENSION PIPES, AND HYDRAULIC MAINS.

But the same conveyor also receives coke as it is discharged from the retorts, and elevates, conveys, and delivers it over screens to a battery of steel-and-brick hoppers situated alongside the retort-house, or into a hopper for feeding the producers, or it may be conveyed back to a hopper suspended above the railway siding. The wagon may thus be emptied of coal and filled with coke without being moved on the railway.

The West lip-bucket conveyor is deserving of a more particular mention, since it obviates the necessity for a mechanical filler. The conveyor is still of the gravity-bucket design, but instead of the buckets being spaced on the chain with a definite space between, each bucket overlaps the other—being provided with a lip—so that a continuous pocketed belt is offered to the material which is to be conveyed. It is not until the conveyor changes direction from the horizontal to the vertical that the buckets swing clear of each other. The advantages of this are very apparent when the handling of coke is considered.



Producer Platform, showing Coke Bogey and Runway and the 1-Ton Electric Lift.

The coke, as it is discharged from the retorts, passes direct into the conveyor buckets. No filler, with its attendant formation of breeze, is required. Another point of great importance is that the coke is not pushed or dragged; it is carried in the buckets without disturbance. The trough, beneath which the buckets run, is carefully designed so that the coke never comes into contact with the rollers and joints of the chain. The conveyor is equipped with the West renewable-bushed chain, which owes its unequalled durability to the fact that there is no wear and tear on the links. The wear of the roller is taken by the outside of the renewable steel bush, and that of the chain—at changes of direction only—is taken by the inside surfaces of the bush extending the full length of the joint pin.

The mechanical portion of the plant is operated by electric motors. 15 H.P. is sufficient for the conveyor, 20 H.P. for the coal breaker and mechanical feeder, and 10 H.P. for the lift. The coke extractors are actuated by 4½-H.P. gas-engines, which are installed in duplicate. Each motor is provided with a ratchet type starter with overload and no-volt release.

The retort-house building is a pleasing structure consisting of a steel framework filled in with a good quality pressed red brick. It is exceptionally well ventilated and lighted, and fully equipped with platforms to all points of operation and inspection. Access to all platforms is gained by convenient staircases.

Mr. Bloor is to be congratulated upon having provided such excellent conditions both for the workmen to perform their duties and for the technical staff to exercise supervision. His reward should be contented and efficient service, tending to the best results.

Thermal Efficiency of Internal Combustion Engines.—There is to be introduced for discussion next Tuesday (April 8) by Mr. George J. Wells, Assoc.M.Inst.C.E., the subject of "Standards of Comparison in Connection with the Thermal Efficiency of Internal Combustion Engines," at a joint meeting of the Institution of Civil Engineers with various other organizations which are co-operating in the work of the Special Committee on Tabulating the Results of Heat Engine and Boiler Trials. Capt. H. Riall Sankey, C.B., C.B.E., will take the chair, and the meeting is to be held at 6 p.m., at the headquarters of the Institution of Civil Engineers in Great George Street, S.W.

Royal Commission on Mining Subsidence.—The Commission propose shortly to arrange a visit to the South Wales coalfield, for the purpose of obtaining by personal inspection of typical cases direct evidence of damage caused by mining subsidence. The localities to be visited have not yet been definitely settled, but the Commission are prepared to receive representations on the subject from local authorities, ratepayers' associations, or other bodies representing areas or groups of persons or interests. It will be understood that only a limited number of places can be personally inspected. In other cases the Commission will be glad to receive and consider photographs and statistics of damage.

THE REBUILDING AND MODERNIZING OF COOKERS.

By HERBERT C. HIGGS, of Basingstoke.

[A Paper read at a Meeting of the Southern Association of Gas Managers (Eastern District), on March 26.]

Now that the question of how best to increase the sale of gas is receiving considerable attention by gas companies and their officials, the position of the hired cooker has become a subject of some interest and concern. It is a well-known fact that in many places a large proportion of cookers on hire are of the old-pattern type, and, as regards the hotplate, obsolete. These have been doing duty for many years, and considerable sums of money have been spent from time to time in overhauling, repairs, and renewal of parts; but, even so, these old cookers cannot render the service of the modern cooker with improved hotplate and high-efficiency burners. The time has undoubtedly come when, in the interests of the consumer, as well as the gas industry generally, a better service should be rendered—especially to the consumer under the prepayment system, where a small cooker with a poor hotplate is usually a part of the outfit.

The system of hire-purchase or purchase outright by the consumer does not meet the difficulty, for when a new modern cooker is installed the obsolete one is returned to swell the increasing stock of old cookers at the works. To insist on the consumers purchasing their cookers outright or by instalments does not popularize the use of gas. For many years it has been the custom to let cookers on hire at a reasonable rental, and the public expect it; and it is in this direction that progress may be looked for. At the present time there is a tendency to push the sale of cookers in order to swell the turnover in the fittings and showroom department. This in a way may be praiseworthy enough, but the inevitable result must be, as already stated, the piling-up of stocks of old cookers and adding seriously to the problem of what to do with them. There are two ways by which the difficulty of the obsolete cooker can be met. One is to scrap it "lock, stock, and barrel;" the other to rebuild it, with the essential parts added, to make it equal in efficiency and appearance to the modern apparatus. To scrap a large number of cookers and replace with new modern appliances of equal size is a financial problem not easy of solution. For instance, a rent of a half-a-crown per quarter represents a cooker the original cost of which was only a little more than half of what a modern one of equal size costs to-day. To increase the rent to the equivalent proportion would cause great dissatisfaction among the consumers. To retain the present rental and replace the old cooker with a new one in every way superior would equally be a source of trouble, unless all were served alike in the same district and at the same time—which would be a heavy financial responsibility for any company to contemplate. It seems, therefore, that the most practical and economical way of dealing with the matter is to rebuild the old cooker; and that this can be done I hope to show later.

To those who have carefully considered the question, the wholesale scrapping of old cookers must ever appear a wasteful and economically unsound procedure. As is well known, the main features of the gas-cooker have not materially altered for many years. For example, the oven structure, including the crown-plate, is what it always has been. Makers have concentrated their efforts in enlarging and improving the hotplate by introducing high-efficiency burners with air and gas adjusters and varying types of grill; but, as already stated, the main structure of the cooker has not been changed. It will be seen, therefore, that the problem of rebuilding the apparatus is not such a difficult matter as might be supposed. It really means the application of a new modern hotplate to the unlined or single-cased cooker, with the addition of new enamelled linings to the oven in the packed cooker. I can imagine that at once the question will be raised: What about fixing the hotplate; does not this mean a new crown-plate? Certainly not. There is no difficulty in fitting either mild-steel or cast-iron brackets of simple construction with which to fix the hotplate without in any way interfering with the original crown-plate. With suitable brackets for each class of cooker, the modernizing process becomes a simple matter. Nor is the relining of the packed cooker difficult. It certainly would be if it were necessary to remove the old enamelled plates and the slag-wool packing, but this is not so. The old linings remain in position; and no matter what their condition may be, it does not interfere with the new method of relining.

This is done by the introduction of enamelled plates of special design standardized to fit each class of cooker and bolted-on over the old linings. This method admits of the original grid supports of the oven being retained; and the adding of a new lining, without disturbing the old plates or lagging, tends to the further conservation of the oven heat. Treated in this way, old cookers can be made serviceable again for many years; and, what is more, they have the convenience and efficiency of a modern apparatus at less than half the cost. The rebuilding of cookers in the way described does not involve expensive tools or highly-skilled workmen, nor a great amount of supervision, which is a consideration in small works. The usual stove-repairing shop is suitable, and an intelligent workman can easily do the work.

The hotplates with the latest type of burners and grill can be purchased from the makers, special pressed-steel or cast-iron bridges also included with the hotplate by the makers, and the special enamelled plates can be bought at a reasonable figure per set to suit the different types of cooker.

In order to make the matter clear, and to simplify description, a series of photographs have been taken of cookers actually rebuilt in the manner suggested by the Company's own workmen at Basingstoke, which exemplify what can be done in a comparatively small works. In large works where a staff of stove repairers is kept constantly at this class of work the rebuilding should be a still simpler matter, and could be carried out with greater expedition and consequent economy.

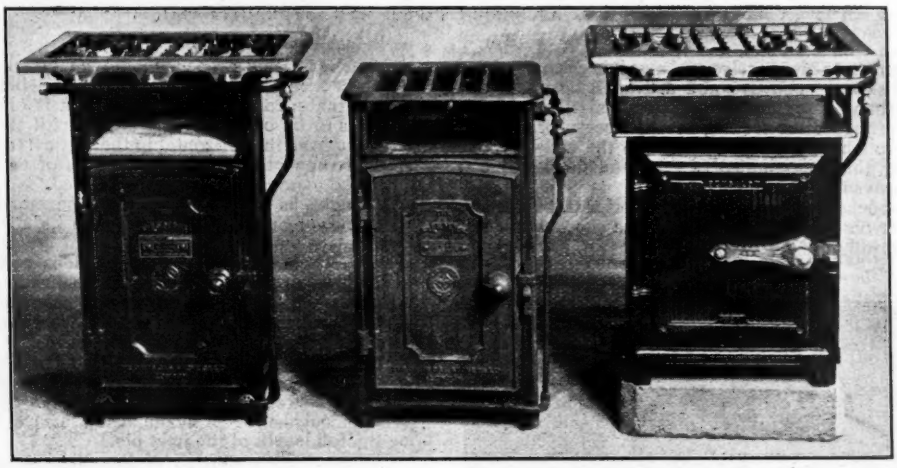


Fig. 1. Fig. 2. Fig. 3.

Fig. 1 is an illustration of a small cooker rebuilt; the original being a "Davis S.M." cooker, as shown in fig. 2. As is well known, this is a single-case model, with small hotplate and two wrought-iron boiling rings, one of which serves as a grill burner with a loose-wire deflector. The rebuilt cooker was in every way similar to fig. 2. It will be seen at once that the rebuilding considerably adds to its appearance; but this, perhaps, is only a secondary consideration; efficiency being the salient point—and this is increased by at least 50 p.ct. In this case the rebuilding consists in fitting a new "Richmond No. 1 Bungalow" hotplate, which has two good-sized boiling burners and a turnover grill. The hotplate is attached to the old body by means of a stamped-steel bracket at the back, and two short straps in front. A new enamelled crown-plate is supplied. The original oven-burners remain; and after adjustment the rebuilding is complete. The total cost of the new parts is 27s. 4d. For some time the cooker supplied with all new prepayment installations at Basingstoke has been the "Richmond No. 1 Unpacked Bungalow" (as shown in fig. 3), placed on a breeze block slab to raise it to a convenient height. The reason why it was decided to adopt the hotplate of this cooker to rebuild the other was to reduce as much as possible the stocking of renewal parts, and to make the two cookers somewhat alike in appearance, and equal in efficiency. As most of these cookers are used by consumers of the industrial class, who live near each other, it is a matter of some consideration that the cookers supplied should be as nearly as possible alike, for reasons which need not be explained.

The labour charges for cleaning, fixing the hotplate, and adjust-

ment are approximately 4s. each for this class of cooker, making an inclusive cost of rebuilding of 31s. 4d., with the result that a cooker is produced equal in size, appearance, and efficiency to a modern one, but at less than half the cost.

The foregoing observations refer to the single case or unpacked cooker. The problem of rebuilding the packed type may seem at first to present considerable difficulty on account of the internal lagging of the oven. This is not really so, as will be shown.

Fig. 4.

Fig. 5.

In fig. 4 is shown a "Davis No. 9 Metropolitan" cooker removed from the district after many years of service. The hotplate is narrow, all the burners are fixed, and the oven linings are badly burnt, and pitted with rust holes. The general impression is at once made that it is only fit for the scrap heap. Fig. 5 depicts the same cooker rebuilt on modern lines; and it will be seen that it looks smart, and is a great advance on the original cooker in point of size of the hotplate, the number and setting-out of burners, and also in general efficiency.

In deciding on the particular hotplate for the purpose of rebuilding, a number of types from different makers were submitted on approval, including that of the makers of the original cooker. After carefully considering the particular merits of each, a hotplate was selected giving a large carrying space for the utensils, good spacing of the burners, and a well-finished bold appearance. An arrangement was arrived at with the makers to supply suitable bridges to fit exactly the lugs on the body of the old-pattern cooker. By this means the fixing becomes simple. The oven is relined with special enamelled plates made to bolt over the old linings without disturbing them or the lagging. The advantage of this will be apparent, as it obviates the necessity of dismantling the whole of the inside of the body. To remove the angles holding the original built-in linings, together with the holding-down bolts, is an exceeding difficult and troublesome matter, involving a considerable amount of time and labour in removing the set screws, which in most cases are badly rusted in. Owing to this difficulty and expense there has been hesitation on the part of many companies in taking-up the question of complete rebuilding. To put on a new hotplate and leave the oven as before is merely tinkering with the work, and cannot be satisfactory either to the company or consumer. The special enamelled plates before referred to are standardized to the particular size and pattern of the cooker to be rebuilt—not necessarily a "Davis," this being named merely for illustrating the principle, which is applicable to any make or pattern. The plates are easy to fix and inexpensive to buy. Fitted complete with these special enamelled plates and with the new modern hotplate, we have an exceedingly efficient and attractive cooker.

The total cost of cleaning, painting, and rebuilding the cooker shown in the photograph was £3 5s., which, as in the case of the small cooker, is less than half the cost of a new one of similar dimensions. Further details need not be given at present. Sufficient has been said to show how much can be done both in the interest of economy and progressive service, if only the question of rebuilding is taken seriously and intelligently.

MIDLAND JUNIOR GAS ASSOCIATION.

A meeting of the Association was held in Birmingham on March 20—Mr. L. H. Thomas presiding.

Mr. Harold Wynne, Works Chemist, Burton-on-Trent Gas Department, read a paper entitled

DEPOSITION IN MAINS.

The question of corrosion in mains and services is one which the present-day gas engineer has ever before him. The general cry of the consumer is "bad gas" whenever there is a shortage of pressure at his burners. To the lay mind this is the only apparent reason. It is up to the engineer in charge to have satisfied consumers; and to do this he must give adequate pressure at all times. This means that mains and services of ample size should be laid, and always kept clean. The cause of this lack of pressure—providing the initial pressure to a district is satisfactory—is due to the deposition of substances in the mains and services concerned.

These substances can really be put under three headings:

(*a*) Naphthalene deposits.
(*b*) Corrosion due to chemical reaction.
(*c*) Deposition of water.

The trouble under the last heading can of course be easily recognized and remedied. Only headings (*a*) and (*b*) need be considered.

Naphthalene Deposition.

This is a trouble which to a greater or less extent has been a trial for many years. Exactly how naphthalene is formed in the carbonization of coal is a matter of great controversy. Much careful work has been done by the late Prof. Lewes and by Prof. Cobb. Owing to the short time at our disposal, we cannot possibly consider the many theories which have been put forward to explain the formation of this troublesome compound. It is generally accepted that naphthalene is formed by the breaking-down of such simple gaseous compounds as ethylene into acetylene and methane, and the polymerization of acetylene into higher compounds. Naphthalene itself has such a great stability that when once formed it resists any effort to decompose it again by heat. We may explain the effect of its formation by the polymerization of benzene, due to excessive heat and the passage of the gas over a large surface of heated coke and retort. This no doubt explains the fact that, until about 20 years ago, naphthalene was practically unknown in Scotland, except in the few works where through retorts had been installed. It might be mentioned that one works in Scotland had no trouble whatever with naphthalene when carbonizing in stop-ended retorts; but when the works were modernized, and through retorts and stoking machinery installed, in less than twelve months great inconvenience was experienced, though the same coals were used as formerly.

The troublesome conditions in the mains and services are produced by varying temperatures. The gas, loaded with naphthalene at a certain temperature, cannot hold this amount when it reaches a cooler temperature. Naphthalene deposits are aggravated by the condensation of water vapour. The natural inference is to cool the gas in the works to such a degree that on the district it will be subjected to temperatures higher than its initial temperature. This would not only stop deposition of naphthalene, but also the condensation of water vapour. Unfortunately this is hardly practicable, for the gas would have to be passed through a freezing mixture.

Remedies.

Unhappily, the remedies which are applicable to one district may not be applicable to another. Many panaceas have been suggested and tried, with good results. There is an old adage which says "prevention is better than cure"; but, unfortunately, in the case of naphthalene we can only look for cures. The several methods which are used to eradicate naphthalene troubles may be summarized as follows:

1. Shock-cooling at the condensers.
2. Washing the gas with a suitable oil.
3. Vaporizing into the gas an oil which has a great affinity for naphthalene.
4. Spraying into the mains at the outlet station governor an oil similar to that used under heading 3.

As a matter of historical interest, it may be mentioned that an early investigator named Bremond found that naphthalene was set free whenever there was condensation of aqueous vapour in gas, that gas deprived as far as possible of aqueous vapour does not deposit naphthalene. Bremond therefore dried his gas by passing it through a vessel containing a desiccating material; but his work was only done on a comparatively small scale. However, something similar is in practice to-day. Some engineers cover the water in the inside of their gasholder tanks and station meters with a thin film of oil. It is found that this method, coupled with one or more of the methods previously enumerated, gives satisfactory relief.

Following out Bremond's idea of drying the gas, I carried out some experiments to determine the amount of water vapour in our town gas. The actual amount of water was found to be equivalent to 33 gallons per million c.ft. The drying medium we proposed to use was calcium chloride, but, owing to the difficulty of reclaiming this for future use, we dropped the idea. It may be of interest to note that in our case the cost of fuel for reclaiming the calcium chloride would have been approximately £70 per annum.

Let us briefly consider one or two points in connection with the previously suggested methods of dealing with the naphthalene trouble. As far as method (1) is concerned, it is perhaps not the best practice, for many volatile hydrocarbons are extracted from the gas, which are themselves carriers of naphthalene, as well as being of greater service in the gas from a calorific point of view. Another drawback which is sometimes overlooked is the fact that large deposits of naphthalene may be found at the seal pots of the condensers, which, when removed by steam, cause the tar to emulsify. This may give trouble in connection with tar sales where a limit to the water content is placed by the buyers. Emulsified tar cannot be freed from water by merely standing in the store tanks.

Regarding methods (2), (3), and (4), they are all useful, and in many cases give beneficial results. Looking at these methods from a broad point of view it is perhaps better to wash the gas on the works, to eliminate freshly-made naphthalene, and to spray a suitable oil into the distributing system, because many of the naphthalene stoppages are due to deposits already in the mains, which change position when changes in temperature occur. It is always advisable to place the washer, whether of the Livesey or rotary type, on the purified gas stream. If attempts are made to extract naphthalene on the crude gas stream, troubles are bound to ensue. At one works the method of treating crude gas was tried. A rotary washer which had been discarded for cyanide extraction, through the failure of a "P. & A." tar extractor, was used. Unfortunately it had to be abandoned owing to the fact that, instead of extracting naphthalene, the reverse took place. The whole medium became an emulsified mass, and the washer had to be shut down and well cleaned out before it could again be put into commission as an ammonia scrubber.

Perhaps the best position for the washer is at the inlet to the station meter. Where back pressure is to be guarded against, a rotary washer is better than a Livesey.

Methods Used at Burton-upon-Trent.

As far as Burton is concerned, we have not a washer at the inlet to the meters, but use a Livesey which has been placed at the inlet to the holders. The great trouble in using this washer is that we have to be very careful not to produce too much back pressure, for our water seals on the purifiers soon "blow." The method we find to give the greatest relief is to fill the washer with water, and to put thereon about 40 gallons of oil per day. During the period of greatest trouble we work with a ½-in. seal on the washer; the oil being of the following composition:

Up to 80° C.	=	0·5
80° to 90° C.	=	3·0
90° to 100° C.	=	2·0
100° to 110° C.	=	17·0
110° to 120° C.	=	21·0
120° to 130° C.	=	17·5
130° to 140° C.	=	29·0
140° to 150° C.	=	8·0
Above 150° C. *plus* loss	=	3·0
		100·0

Sp. gr. = 0·772

This oil contains a fairly large percentage of xylole. This amount (40 gallons per day) is equivalent to about 35 gallons per million, which would mean a cost of £900 per annum, equivalent to 0·5d. per 1000 c.ft. Fortunately we do not have to fill up every day of the year, so these figures are much reduced over a 12-month period. This oil gives satisfactory results, and we have not yet found any condensation at the syphons. My Chief, Mr. William Wilson, has also, as an additional measure, placed a thin film of Scotch shale oil on the surface of the water in the gasholder tank. This, coupled with the use of the oil, reduces naphthalene complaints considerably. When using our vertical retorts alone, naphthalene complaints are reduced to a minimum.

Corrosion of Mains due to Chemical Reaction.

This is a more serious trouble, and one which is perhaps of a later origin. It is particularly annoying in places where a pressure wave is employed to light and extinguish the public lamps, and in high-pressure steel mains. The exact cause of corrosion has given food for much thought and caused much controversy. All investigators are agreed that the prime factors are cyanogen and carbon dioxide in the presence of water vapour; but I would also add sulphuretted hydrogen. Much of the credit for the early investigation of corrosion deposits must be given to Mr. J. G. Taplay, Research Chemist to the Life of Gas Meters Joint Committee, but a splendid paper given by my Chief, Mr. William Wilson, on "Corrosion in a Steel Gasholder Tank" is well worthy of perusal. [See "Journal" for Sept. 12, 1916, pp. 504-5.] Mr. Taplay gives the following as the corrosive agents, in their order of corrosion severity.

1. Hydrocyanic acid.
2. The products of the interaction of carbon bisulphide and ammonia.
3. Excessive oxygen.
4. Carbon dioxide.
5. Sulphur dioxide.
6. Dry carbon monoxide on metallic iron.

Another corrosive agent is undoubtedly sulphuretted hydrogen. I know that by Act of Parliament it is necessary to have the gas free from this, but even in the best-regulated works sulphuretted hydrogen sometimes gets on to the district. With the exceptions of item 6, water must be present for the various reactions.

Corrosion deposits look very much like the oxide of iron used for purification. The interesting fact about corrosion stoppages is that they are worse in the bends and elbows and at the base of vertical wrought-iron service-pipe lines. In the latter case, the corrosion formed drops when dry, and is difficult to remove. Corrosion also attacks cast-iron mains. A case was reported at Burton of a 3-in. depth of corrosion in an 8-in. cast-iron main at a point well removed from services. A theory was once put forward that this corrosion was due to oxide of iron being carried through from the purifiers; but this cannot possibly be so, for the corrosion is not found at all points on the distribution system. Corrosion is never found in compo service pipes.

Hydrocyanic Acid.—This is essentially a product of high-temperature carbonization. It is produced by the combination of hydrogen, carbon, and nitrogen at high temperatures. It is probable that a portion of the ammonia is split up into its elements. These, recombining with carbon, form hydrocyanic acid. The most favourable temperature for this compound to be formed is supposed to be about 1200° C. One of the final compounds which hydrocyanic acid forms with the iron of the mains and services is the well-known compound Prussian blue. This is apparent, without any chemical analysis, from a glance. A large proportion, but certainly not all, of hydrocyanic acid is no doubt extracted by the oxide of iron in the purifiers.

Ammonia and Carbon Bisulphide.—Ammonia is formed mostly as a low-temperature product; but at higher temperatures it may be formed by the direct union of its elements, nitrogen and hydrogen. The maximum yield, however, is obtained at a temperature of about 870° C. The carbon bisulphide is produced mostly at high temperatures, and is due to the combination of part of the sulphur in the coal with carbon. The higher the temperature of distillation, the greater will be the quantity of sulphur driven off from the coke; and this, coupled with the extended travel of the gas over heated coke, as in modern horizontal-retort practice, accounts for the decomposition of the sulphuretted hydrogen, giving rise to carbon bisulphide.

Excessive Oxygen.—This compound should not be present to any extent in either coal gas or water gas. It is produced by over-pulling, through badly fitting doors, and by the admixture of too much air for revivification purposes.

Carbon Dioxide.—This is also produced by over-pulling through leaky retorts, thus pulling in furnace gases.

Sulphur Dioxide.—This compound is not found to any large extent in ordinary coal-gas practice, but is found in the manufacture of water gas. It is produced by the action of the air on the sulphur content in the coke (as ferrous sulphide) during the blow, and by the action of the steam on coke and ferrous sulphide during the run.

Sulphuretted Hydrogen.—Formed by the direct union of sulphur and hydrogen.

Carbon Monoxide.—Large amounts of this gas are obtained in water-gas manufacture or when steaming vertical retorts.

These few remarks relating to the various corrosive agents, though scanty, may be of some use when we come to discuss the prevention of corrosion.

Prevention of Corrosion.

Hydrocyanic Acid.—Taking the corrosive agents in the order previously enumerated, the only way to prevent hydrocyanic acid entering the district is to extract it at the works. Many processes for the extraction are well known, but, owing to the great fluctuations in the market value for prussiate, even large works have had to discard the extraction of this substance. The great question which will have to be faced is whether it will be cheaper—even though it may be a loss on the working of the plant—to bear this, rather than suffer, perhaps, the loss of large consumers due to the annoyance of services being continually stopped, and the cost of renewing mains and services perished or choked by corrosion.

Ammonia.—Regarding the question of ammonia, it behoves every engineer to see that this substance is extracted on the works.

Carbon Bisulphide.—As far as the extraction of carbon bisulphide is concerned, there is the old process of extraction at the purifiers by sulphided lime (which is now almost discarded, except on small

works), and the well-known catalytic process of the South Metropolitan Gas Company, which, however, is hardly practicable for smaller and medium sized works. The industry would be interested to know if the number of corrosion stoppages has been reduced in the South Metropolitan area since the introduction of this process. Carbon bisulphide reacts with ammonia to form sulphuretted hydrogen and sulphur dioxide—both active corrosive agents. It may be found necessary, therefore, to revert to partial lime purification as in the old days, when the sulphur compounds other than sulphuretted hydrogen had a limit placed upon them, in order to minimize this reaction. If ammonia is absent this reaction could not occur. Dr. Carpenter, in his presidential address to the Institution of Gas Engineers (1914), stated that it is advisable to eliminate sulphur compounds entirely. It is the opinion of some engineers that corrosion first showed itself immediately lime purification was discarded. Definite information on this important point is most desirable.

Oxygen.—This substance, as previously stated, should not be present. In some works the amount of air for revivification purposes is perhaps put in indiscriminately. Oxygen undoubtedly plays an important part in corrosion. Not only for this reason should as little oxygen as possible be in the gas, but also a high oxygen figure indicates a high nitrogen content, which acts as a diluent, thus reducing the calorific power.

Carbon Monoxide.—Though placed as a corrosive agent, this does not play any part in corrosion of mains and services themselves, as the substance formed (iron carbonyl), brought about by the inter-reaction of carbon monoxide and iron, only takes place at a temperature of about 70° C. Such a temperature is, of course, never attained in any part of the distributing system.

Sulphuretted Hydrogen.—The question of corrosion due to the presence of sulphuretted hydrogen is very important. We have already noted that during the interaction of ammonia and carbon bisulphide, sulphuretted hydrogen is produced. This, with the iron of the mains and services, produces ferrous sulphide. This latter substance, where excess of oxygen is present in the gas, produces a revivification process, with the deposition of sulphur. This presence of sulphur can be verified by igniting samples of corrosion, when the distinguishing odour of sulphur dioxide is obtained. I do not wish to infer that all deposits of free sulphur are produced by sulphuretted hydrogen entering the distributing system; but whether or not this sulphur is produced by the interaction of ammonia and carbon bisulphide or through sulphuretted hydrogen passing on to the district, it is undoubtedly present. At Burton, for years we have had insufficient oxide purification area. This is now being remedied.

At Burton-on-Trent we find the corrosion in some cases is formed in a comparatively short time. In less than six months new services have been completely choked. If fitters indiscriminately use a solvent for naphthalene without first using the force pump, it has been found impossible to clear the service without cutting it out. In carrying out tests with the various corrosive agents, the interesting fact has been noted that, when a piece of clean iron has been inserted in the solutions for six months, practically no action could be detected, while when the same material has been left with its original scale in contact with the same solutions, then corrosion has been set up. This naturally brings us to the conclusion that if all pipes could be laid free from scale it would tend to reduce the evils of corrosion. Whether a suitable coating for the inside of the pipe can be found, which will act as an anti-corrosive agent, remains to be seen. Dr. Carpenter on one occasion reminded us that the ancients worshipped fire as the emblem of purity. We ought as members of the gas profession to have our god of purity, and see to it that the gas we supply is as pure as possible. If we neglect this, then corrosion will always be with us.

In conclusion, I should like to express my indebtedness to my Chief for valuable criticisms in connection with this paper.

Discussion.

Mr. H. Clark (Derby), in congratulating the author on his paper stated that naphthalene trouble was now unknown at Derby, though at one time it was extremely prevalent.

Mr. J. Hewitt (Distributing Engineer, Birmingham) commented with satisfaction upon the immense improvement that had taken place in Birmingham also with respect to naphthalene in the mains. It was true, however, that it was a source of considerable trouble at some of the works, and he hoped that more systematic measures would be taken to deal with it.

Mr. J. H. Gee (Central Laboratory, Nechells) took exception to the statement that water vapour could be dealt with easily. As to the naphthalene difficulty, the only cure seemed to be the removal, to the lowest limits, of the naphthalene before the gas entered the holder.

Mr. A. R. Myhill (Central Laboratory, Birmingham) said that, if the water in the gas could be got rid of by a cheap and easy method, freedom from many of their troubles would follow. He would like to know something as to the cost of the use of calcium chloride. Compo piping might be used advantageously in many places.

The Chairman, in regard to hydrocyanic acid corrosion inside the holder, said he had noticed that tie rods above the water level up to the umbrella were blue. There certainly was some corrosion on top; and it seemed to him that great efforts should be made to get rid of the cyanogen from the gas.

Mr. Wynne, replying to the discussion, said he did not wish to infer that the elimination of water vapour from the gas was an easy matter. The question was a most important one; and he felt they ought to send out a perfectly dry gas.

The following paper was then read by Mr. George Ball, late Chief Mains and Service Inspector, Birmingham.

PRACTICAL HINTS IN CONNECTION WITH GAS MAINS AND SERVICE WORK.

In connection with this subject, the scope being so small, it is impossible to give an additional paper without repeating some of the matter which has already been spoken about. The most important items are good material, good workmanship, and the keeping-down of unaccounted-for gas. This can only be obtained by close inspection of material and labour. Of course, there are other places to look for unaccounted-for gas—viz., works mains, station meters, and defective holders. In mining districts men are employed constantly to bar the roads to prevent breakages of mains, otherwise the unaccounted-for gas would be very heavy. In districts where subsidence trouble is unknown, it is advisable in the summer systematically to bar the unpaved roads in which mains and services are laid. When you find a trace of gas, do not leave it until the source of leakage is found, otherwise it may be more serious during the following winter, particularly if it should be a cold one. Only a small gang of men is required for this work—a reliable service layer, one handy man, and one labourer. A light handcart containing the following tools is necessary: Sledge hammer, steel bar, pick, shovel, few setts, and rammer. There should also be reserve materials, in case of breakages, such as clay, wrapping, &c.

Leaky joints can be reset at once; but where the fault is due to fractured mains, the man in charge will communicate with the works, for more labour and the necessary material.

Another point in connection with the unaccounted-for gas—and this should be carefully watched—is the drilling and cutting of holes in the mains, for services and other purposes. The combined drill and tap, if used properly, will give the best results for holes up to 2 in. (unless you use a special drilling apparatus, of which there are now several on the market). The man in charge should be instructed to fill-up the hollow of the tap with fat, and have a yarn washer fixed ready to cover the hole as soon as the point of the drill is through the main. This will prevent waste, and any danger through inhalation of the gas. He should have a plug in the fitting he is going to insert in the main, ready to fix in its proper position as soon as he takes the tap out of the hole, for the fewer times the hole is open the less amount of gas will be lost. Cheap and careless men are no good on this class of work.

Where possible all services should be laid with a fall to the main, with a minimum depth of 16 in. below ground-level. The tube used for services should be of best steam quality, and laid in square wood troughs filled with pitch containing a small amount of bitumen, to consolidate it. This material can be prepared in blocks at the works, and sent out on the work as required. Before being laid, all tube should be examined to see if it is clear; and if it is necessary to cut a length, the end cut should be left clear of any burr on the inside, as this is the place where naphthalene would commence to collect. In all cases the sockets should be taken off each tube. The thread of the reverse end should be smeared with a mixture of red and white lead mixed with boiled oil or graphite (the latter can be bought ready for use). The socket should be reversed and then screwed on tightly with a plug in the end. The reason for reversing and screwing the socket on the reverse end is to make sure that the thread will follow when being laid in the trench. Before replacing the socket or any fitting a small quantity of the mixture used should be smeared inside before the thread is screwed in. Care should be exercised in doing this, for, if too much is inside the socket or fitting, when set hard it may at some future time cause a stoppage, particularly if there is any naphthalene about. For cast-iron services a bag or bladder should be used to keep the gas back during the progress of the work. It is advisable to fix a valve, in addition to the one near the meter, on all services of 2 in. and upwards, where possible within 6 in. from the kerb.

Many mains are being laid on the footpath, and the valve should be 18 in. from the building or boundary-fence line. This is useful for shutting-off the supply in case the premises are on fire, or when executing any necessary repairs to the portion of the service between the valve and the inlet of the meter. Valves, unless absolutely necessary, should never be in the middle of the footpath, for a broken valve cover may cause an accident; and a claim for compensation may be made. A careful card register should be kept of these valves; and the latter should be examined, closed, oiled, and opened at least once a year. All service and bag holes should be drilled in mains up to and including 6 in. Above this size they can with safety be cut in; but care must be taken that the holes are cut in and not knocked in. The rimers in these cases should not be too large at the points, so as to ensure a good hole being made; and no undercutting of the inside of the main should be allowed.

Where possible, all services up to 2 in. should be laid off the top of the mains. A long screw and back nut should in all cases be fixed near the main; the best place being next to the bend or elbow which is screwed into the main. In finally making the back-nut good, a thin strand of yarn should be used as a washer between the back-nut and the socket. For services laid across the full width of the road, and where a bend and upright are used where the service enters the house, it is advisable to have a standard rule for "L. S. & S." nut to be fixed in addition to the

one on the main under the footpath. In case of stoppage, the connectors can then be easily disconnected, without a lot of ground being disturbed.

For services to premises without cellars, or with cellars at the back only, without a side entrance, it should be advocated that, where there is no front cellar, and where the floor is wood, with a space between the floor-boards and the earth, no gas service pipe should be laid under the floor, for at some future time it may lead to a very serious accident. In no case should a gas service pipe be laid under a front-room floor to a back cellar. Of course, builders are likely to object to the pipe being put on the outside of the walls. This can, however, be easily overcome by turning-in the service pipe just above the floor-level. Special bends can be used to avoid having a thread in the wall. In cases where it is necessary to lay from the main a larger service which will not allow the drilling of the size of hole required, a special casting, called a boss piece, should be used, tapped to the size of the hole. This can be fixed with less excavation, and does away with the lead joint on the service near the main. The casting, being shorter than a branch, is cheaper, and, in my opinion, makes a better job. This procedure is only necessary in mains from 2 in. to 4 in. inclusive. It is also advisable to have 6-in. boss pieces for 2-in. holes, so that, if you should get a broken main at a 2-in. hole, you can cut out the short piece of main and insert a boss piece. This makes a far superior and stronger job than a 6-in. pipe with a 2-in. hole. It is advisable to have socket and spigot and double-socket boss pieces in stock, because, if at any time you are relaying or enlarging a main, the double-socket pieces will be found very useful for using-up the plain pieces of pipe in stock. It is advisable to stock all sizes of branches.

Fixing Branches and Boss Pieces, or Repairing Mains.

Before attempting to cut out mains, it is advisable to calliper them, to see that the new castings will fit the old ones; for, when you have got the main apart, and the socket or collar will not go on the spigot of the pipe, it will cause a considerable waste of money, and may lead to complaints. Another important point is never to cut out any main, large or small, until you have tested the pressure, by inserting a bag between two pressure pipes, so that you can see the actual fall of the pressure on the gauge as the bag is inflated. If you have any doubt of the bag holding the gas, insert another one in the opposite direction, and leave the hole open when inflated. You will then see if the first bag is holding tight. I instituted this system many years ago, and I am pleased to say it has never failed.

On many occasions it has been found necessary to fix riders. The size of the rider required can easily be calculated from a simple slide rule. When the mains are severed, always insist upon wood plugs being fixed in the two ends of the pipe. During any excavation that may be necessary, never allow yarn or any other material to be placed in the ends. Owing to the extra pressure now required on the district, it is not advisable to cut out any main larger than 6 in. without using two bags at each end of the portion to be cut out. In fact, on large mains (24 in. and upwards), if the pressure is above 30-10ths, it is advisable to have an additional bag at each end, making six in all, which should be about two pipes length away from the others. When cutting out a main or taking off a plate of any kind, never interfere with it till such time as you have made sure that the bags are holding back the gas. This can be done by putting a temporary hole in the main, or slaking the plate. If the bags hold, the waste gas will soon pass away when the hole is open, and you will then know you can proceed with the work in safety. It is advisable, when fixing and drawing the bags on large mains, for the men doing the work to use gas masks. It is always best to have extra jointers on the job in case of accidents, for in this class of work you never know what is going to happen. In all cases where large live-main work is being undertaken, it is always advisable to have an inspector on the job from the commencement until the bags are drawn and the bag-hole plates fixed. It is not necessary to finish-off the joints before the bags are drawn, provided they are made gas-tight. The shorter time the bags are in the main the better. A full oxygen bottle should be at hand during the progress of the work.

Clearing Mains of Air.

Any of the leakage indicators can be used with safety; but you must take the sample of gas from the bottom of the main. This can easily be done by inserting a ½-in. tube with bend through the blow hole to the bottom of the main at its lowest point. The bend should be turned in the opposite direction to the gas flow. If you should get a reading of "all gas," close up the hole with clay, and try it again in about five minutes. If you should then get a reading of "all gas," you can with safety let the gas on to the district. I have used these indicators many times, and they have always been successful. There should always be a blow-off pipe at the lowest portion of the main. The dip-pipe of the syphons will act as this, if care is taken not to get the syphon sealed. If you should, it will pay to unseal it rather than to fix another blow-off pipe. This can be done by inserting a small pipe through the dip-pipe to the bottom of the syphon, and pumping the water out.

Coating of Pipes.

Never have pipes coated inside and out—or, in other words, dipped. If you do, you are asking for trouble. All main pipes should be coated outside only, except for 6 in. at the spigot end, and the face of the sockets. There is then no danger of the gas dissolving the coating, and causing the joints to leak, which is sure to happen if they are dipped. When laying live mains it is best to use a stopper. This can be drawn through each pipe as it is laid. It is safer and better for the men, avoids loss of gas, and ensures a clear main. When laying dead mains, see that a mandrel is drawn through each pipe as it is laid. You will then be sure the main is clear. On several occasions I have found pieces of trees, stones, pick shafts, tea cans, &c., in the mains. These cause a lot of trouble and expense.

Valves on Mains.

When it is necessary to fix a valve on a main, it is always advisable to make arrangements for oiling. It is no good putting oil round the outside of the spindle. By experience I have found it useless. I have taken the matter up with representatives of different valve manufacturers, but they do not seem to appreciate the necessity for oiling. The only way to insure valves working properly is to drill a hole or holes in the cover in such a manner that you can pump oil on to the spindle and the faces of the racks. In one case a valve would not shut-off the gas after it had been in use a short time. I told the makers that only lubrication was necessary. The valve in question, being an emergency one, was taken to pieces, cleaned, and well oiled. Holes were drilled in the bonnet, and pipes were brought up to near the ground-level for pumping in the oil. Since then no trouble has arisen. The oil is forced in by a pump which holds about ½ pint. One charge is put in with the valve open, and another when shut. The valve is then worked up and down. All examination should be done regularly, and records kept on a card for each valve. It is not advisable to trust this matter to workmen. It should be the duty of the inspector or foreman in charge to see that the work is carried out properly, and the records handed in to the office. It is best to have a duplicate set of cards, one for the man in charge of the work, and the other for the office.

Escapes.

All reports of escapes should be treated as dangerous until found otherwise. It is better to send to an escape and find it is only slight than to run the risk of a serious accident. It is also advisable, if the escape is not a serious one, and not located before dark, in a residential district to leave the ground open and a watchman in charge. This enables the gas to get away, and gives a better chance of locating it next morning. If it is a serious escape, never leave it until it is found, and made temporarily safe. Even then, with the heavy traffic about, it is best to leave the ground open, and a watchman in charge.

Tracing Stoppages in Mains.

In case of complaints of short supply, the best plan is to fix a 24-hour pressure register in the neighbourhood of the complaint. This will give you the time of the trouble. Then you can get to work on the mains, starting this by taking the pressure on the lamps. If there are no lamps, it will be necessary to put pressure pipes in the mains, and then follow back till you get behind the stoppage. On one occasion I traced-back a stoppage for two miles on lamps 150 yards apart. I got behind it and then tried the lamps 75 yards apart, and located between the two. The next day I had two holes put in the main 20 yards apart, which localized it to that distance. An additional hole was drilled and the leakage found. The find was very interesting. The main had been laid about thirty years. To see what the trouble was I arranged to have the pipe cut out whole. There was a block of naphthalene; the only passage for gas through a 6-in. pipe being a ¾-in. hole. On clearing the pipe, the stoppage consisted of a portion of a tree branch about 5 ft. long, three small pieces of wood, and about half-a-bucket of stones. This shows the necessity of using either a stopper or a mandrel when laying mains, and seeing that the ends are closed-up each night until the work is completed.

An informal talk followed on points raised in the paper; those taking part being Mr. S. W. Simmons (Dudley), Mr. L. Sturdy (Birmingham), Mr. H. Percy (Birmingham), and Mr. Hewitt.

To the authors of the papers a hearty vote of thanks was passed on the motion of Mr. H. Clark, seconded by Mr. J. H. Gee.

Mr. Ball acknowledged the compliment on behalf of Mr. Wynne and himself.

An interesting meeting then terminated.

Scottish Junior Gas Association (Western District).—The annual general meeting is arranged for Saturday next (April 5), at 3 o'clock, in the Royal Technical College, Glasgow, when the report will be submitted and office-bearers elected. At the close of this business, Mr. James Dickson, of Johnstone, will address the meeting, and this will be followed by the annual social.

Domestic Hot Water.—Hot water at will is one luxury which wealth should not monopolize, for it can be provided economically in every type and size of house. This is proved in the current issue (No. 121) of "A Thousand-and-One Uses for Gas." In this bright and attractively illustrated publication, which will interest every member of the household, the remedy for all hot-water troubles is suggested—a remedy which, it is claimed, will "pour oil on the machinery of household management." All interested in this domestic problem should send for a copy of this publication to the Secretary, the British Commercial Gas Association, No. 30, Grosvenor Gardens, S.W. 1.

Preventing Evaporation from Tanks.

In Serial No. 2547, recently issued by the United States Bureau of Mines, Mr. Ludwig Schmidt (Assistant Petroleum Engineer) says that recently the petroleum industry has displayed such interest in the prevention of evaporation losses that much equipment is being designed for this purpose. Among recent developments is a new type of tank roof known as the "floating roof," which practically eliminates the vapour space over the surface of the oil, thus removing one of the chief causes of evaporation. There are, quotes the "Gas Age-Record," at present at least two types of floating roofs, which, while similar in fundamental principle, differ mainly in the method of making contact with the inside shell of the tank. One of these types is known as a floating tank deck, and has on its circumference flexible metal baskets, containing gravel, that rest against the shell of the tank. In the other type, contact with the tank shell is made by the use of movable buffers or shoes. These are attached to the outer ring of the roof, and are pressed against the tank shell by means of springs. By elimination of the vapour space, the fire hazard is also reduced in that there is no large confined space filled with explosive vapour, nor is there any large body of liquid exposed to the air. With this type of construction the exposed liquid is in a very narrow slot of sufficient depth to prevent free circulation of the air which is necessary to support combustion.

Gas Appliance Society of California.

The Gas Appliance Society of California lately held their second annual convention, in the Pacific Gas and Electric Company's gas laboratory, San Francisco. There was an attendance of well over five hundred at what proved to be a completely successful gathering. The Gas Appliance Society, it may be pointed out, is a co-operative sales organization of all branches of the gas industry—manufacturers of gas equipment, distributors, jobbers, retail dealers, and gas companies. It is the first organization of its kind; California being the only State in which the gas companies have given up the merchandizing of gas appliances, and turned this business over to the dealer. The idea has proved so mutually profitable to all the members that the movement is being viewed with a great deal of attention. Its objects are to promote the sale of gas-consuming appliances of quality, and the use of gas generally; to establish a spirit of fraternity between the members, as well as cordial relations between manufacturers, jobbers, distributors, retailers, gas companies, and consumers; and to facilitate the education of employees of the members, to enable them better to perform their duties. There are at present fifteen organized units of the Society in Northern and Central California. These units have their own offices, and regulate their activities in a manner suitable to local conditions. They are combined, however, by a State Advisory Committee

"The Story of Coal."

To what extent the miners' demands for increased wages are influenced by political motives should be apparent when the result of the ballot on the owners' terms becomes known. From No. 7 in the series of advertisements telling the story of coal, which appears elsewhere in this issue, it is quite clear that the concessions made by the owners go a very long way to meet the wage demands of the miners, and, indeed, surpass them in respect of the lowest paid men, on whose behalf the claims were principally based and for whom public sympathy was aroused. The cost of these concessions will be anything from 12 to 17 millions per annum in addition to the present wage bill, according to the general condition of the industry and the number of districts that are above or below the minimum. Unless this burden is passed on to the consumer, it will fall with terrible severity upon those districts least able to bear it; and it is by no means certain that the final result of this attempt to ameliorate the lot of the mine workers may not result in the stoppage of many pits and serious unemployment in certain districts in an industry which has hitherto been immune from that great evil. It is much to be hoped that the principles of the Wages Agreement will be maintained. An agreement which gives to the workers at least 87 p.ct. of the divisible proceeds of the industry is not lightly to be scrapped. And as for the minimum wage, although one might wish to see the miners, in common with other workers, in receipt of a higher weekly wage, there are many hundreds of thousands of agricultural workers who would welcome a minimum wage of 7s. 6½d. a day; and it must be remembered that the surface worker to whom this wage applies is one who does not run the risks of work underground, and whose skill is probably far less than that of the average agricultural worker. If these terms are rejected by the miners, it will be evidence that there is more in their agitation than dissatisfaction with wage rates, and that their real object is to force upon an unwilling public some instalment of nationalization or Government control.

At the meeting of the Municipal and County Engineers' Institution (South-Eastern District, comprising Kent, Surrey, and Sussex), held at the Holborn Restaurant on Friday, the 28th ult., among the topics down for discussion was the question of "Improved Public Lighting," to have been opened by Mr. W. J. Liberty, Public Lighting Inspector, City of London. Owing, however, to the large amount of business on the agenda, the topic stands adjourned until the next meeting.

CORRESPONDENCE.

[*We are not responsible for opinions expressed by Correspondents.*]

The Coke "Breeze."

SIR,—I note that Mr. E. V. Evans is aware of the etiquette of acknowledging the work of prior investigators; but were it not for the fact that this is the third time he has failed to make due acknowledgment, I would have refrained from entering the field.

As Chief Chemist of the South Metropolitan Gas Company, he would be aware that in August, 1921, I received a request from his department for a copy of a paper on "The Carbonization of Coal at Low Temperature," read at Newcastle-on-Tyne on Aug. 6, 1921. This paper, a copy of which was forwarded by return mail, dealt with the coking process generally, and with the suggested manufacture of smokeless fuel from blends of coal and coke breeze. Mr. Evans is also aware that his Company manufactured fuel according to the process outlined in that paper, that he described the fuel and demonstrated its properties at the Royal Society of Arts on Feb. 8, 1922 (see "J.R.S.A.," Vol. LXX., p. 301). No reference was made to what appears to be the source from which the suggestion was obtained.

I attended Mr. Evans' Cantor Lectures, and was particularly interested in his description of the behaviour of coal under heat treatment, and his proposal for increasing the conductivity of coal. He dealt with these aspects in over 1000 words, but could not find room for one line to quote the reference "Trans. Inst. Min. Eng.," Vol. 62, pp. 9-32.

In his lectures he showed that it was the behaviour of the coal in the low-temperature stages that determined the rate of carbonization. This was not novel. His statement: "It is *conceived* that the outer crust, &c.," certainly suggests originality; but it should have read: "It has been *demonstrated*, &c." See my fig. 4. The proposal to increase the conductivity of the coal by admixing with breeze was also second-hand. See my heat-transmission graphs, figs. 2 and 7. I will not weary your readers by quoting line against line; but it is worth while comparing Mr. Evans' fig. 4 with my fig. 3; and I would ask Mr. Evans to produce evidence that his sections on the physical behaviour of coal and conductivity are more than a paraphrase of the corresponding sections in my paper.

Having had his attention drawn to the foregoing, and to the researches of Dr. G. Weyman, who showed that the destruction of the plastic layer resulted in an increased rate of gas evolution, Mr. Evans still refrains from making acknowledgment, and in this at least he is consistent.

As to the lack of novelty of breeze treatment, I drew attention to Souquière's patent dated 1859, *loc cit*, and am aware that it was subsequently patented in 1889, 1900, and yet again by a well-known chemist in 1921!

Finally, I will not thank Mr. Evans for referring to me in the capacity of an advertising agent ready to extol the virtues of the so-called "Metro" fuel.

JOHN ROBERTS.

"*Parkdale*," 30, *Mulgrave Road, Dollis Hill, London, N.W., March* 28, 1924.

The Conveyors at the Portsea Island Gas Company's Works.

SIR,—We notice from the current issue of the "GAS JOURNAL" that you publish a paper read by Mr. S. E. Whitehead, of Plymouth, before the Southern Association of Gas Engineers.

In this paper reference is made to "De Brouwer" conveyors, and it is on account of the very unsatisfactory results published that we feel that the paper draws from us comment in a general manner, as the name "De Brouwer" has been regarded in the gas industry as a sort of unwritten trade-mark of this firm since manufactures bearing this name were introduced into this country by us many years ago. This statement is made with the full knowledge that there are other firms in this country to-day manufacturing articles bearing the name "De Brouwer"—such articles being copies of originals made by us. It is nevertheless a fact, however, that the gas industry as a whole associates the name of this firm with any product bearing those two words.

It will therefore be of interest to your readers to know that, as far as we can see from our records, no "De Brouwer" conveyor has ever been supplied by us to Portsea. Our records show that the inquiry for the plant mentioned was received by us in May, 1919; and we afterwards learned that, even though "De Brouwer" conveyors were specified, the order was placed for execution in the Midlands. The particulars we have before us relating to our own manufacture of the "De Brouwer" type of hot-coke conveyor show a life which is many times in advance of that published in your columns.

We mention this out of interest to your readers, and with the intention of correcting, if necessary, an otherwise erroneous impression.

Per pro W. J. Jenkins & Co., Ltd.,
J. L. BUTLER,
General Manager.

Beehive Works, Retford, March 28, 1924.

"Low-Temperature Fuel Treatment in Gas-Works."

SIR,—The article by Mr. N. E. Rambush, which appears in your issue of March 26, under the above title, is very interesting, but I claim the courtesy of your columns to state explicitly that I am the sole inventor and patentee of the gas generators to which Mr. Rambush refers. Messrs. Ashmore, Benson, Pease & Co., Ltd., were merely the Contractors whose tender was accepted (from among several quotations, tendering on my drawings) for erecting the plant. The tender submitted by Messrs. Ashmore, Benson, Pease & Co., Ltd., specifically stated that the generators quoted for were designed on the lines laid down by myself (except for a non-essential mechanical fuel feed, which is not a proprietory patent).

The fact that the Council contracted for a Moore plant, and their

reasons for so doing, are evident from the words of Councillor W. S. Liddall, J.P. (Chairman of the Scunthorpe and Frodingham U.D.C.), in his "Review of the Council Activities during the Year 1921," from which I quote, as follows:

> "Perhaps the most notable event of the year so far as the gas department is concerned was the starting up of the new gas-generator." "This is a modification of a new patented process of gas production . . . and engineers have visited Scunthorpe from all parts of the United Kingdom and from France and Belgium to view this notable invention of Mr. Moore. It is this carbonizing process that the gas committee unanimously recommended the Council to adopt for the new gas-works now in course of erection."
>
> ("Hull and Lincolnshire Times," January, 1924.)

Mr. Rambush quotes from a speech delivered in the Council Chamber at Scunthorpe, in January, 1924, by the Chairman of the Gas Committee. Why did not Mr. Rambush quote from the same speech as follows?

> "Time went on until October, 1921, when Mr. Moore brought out a patent in connection with gas production. It was then recommended that two machines on the principle of Mr. Moore's patent should be installed. The Council therefore decided upon these machines."
>
> ("Scunthorpe and Frodingham Times," Feb. 1, 1924.)

That the Technical Press (and therefore the gas industry generally) has knowledge of my pioneer work at Scunthorpe, is evident from the following extracts from a "GAS JOURNAL" editorial (May 3, 1922):

> "The experimental and development work at Scunthorpe on the 'Moore' gas-generator, together with the indications of results that have been published from time to time, have aroused in gas technical circles an amount of interest in the system. . . . It will be seen . . . that the system can be made . . . to operate to suit any desired circumstances; so that the engineer who wants all gas, or has a sudden demand for more, can have it, or the engineer who desires secondary products can work to their realization. The adoption of such a plant therefore does not tie one down to any hard-and-fast line of operating procedure."

The late revered Mr. Tom Settle wrote me a highly valued letter, after a three days' visit of inquiry and inspection at Scunthorpe, from which I extract the following:

> "I feel quite confident to measure from past and ripe experience that the 'Moore' system has before it a future of which I dare to say you can hardly realise the magnitude."

Well, the new Scunthorpe generators are at least a beginning of something new to the gas industry. During the two years that have elapsed since the contract for these was placed, I have devoted myself to securing further improvements, and my Company has obtained nine additional supplementary patents and provisional protections. It remains to be seen whether we shall realize all our expectations, but I am confident that the gas industry will see to it that no encouragement is given to the deprivation of the inventor of the fruits of his labour, and that the results now published with regard to the "Moore" gas-generators at Scunthorpe may induce progressive undertakings to give Messrs. Moore's Gas Generator Syndicate, Ltd., a chance of proving that better results are obtainable.

SAMUEL MOORE.

7, Southfield Gardens, Twickenham, Middlesex,
March 29, 1924.

P.S.—The Moore Gas Generator invention was provisionally protected as far back as May, 1920, and fully patented before Messrs. Ashmore, Benson, Pease, & Co., Ltd., were invited to tender for the Scunthorpe installation to my general drawings.

REGISTER OF PATENTS.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official Journal" for March 26.]

Nos. 6739 to 7383.

CROSSLEY, T. L.—"Gas-burners, &c." No. 6881.
DEMPSTER AND SONS, LTD., R.—"Valves for gas purifiers, condensers, &c." No. 6756.
DOUGALL, J.—"Coin-freed prepayment mechanism." No. 6955.
DRAKES, LTD.—"Mechanism for screening coke, coal, &c." No. 7318.
FOX, J.—"Gas-analysis apparatus." No. 7007.
HACKFORD, J. E.—"Combustion of gaseous fuel." No. 7160.
HORSFALL, J. E.—See Dempster and Sons, Ltd., R. No. 6756.
JONES, T.—See Crossley, T. L. No. 6881.
KOOPMAN, E. B.—See Hackford, J. E. No. 7160.
LEBLANC, B.—"Gas-engine." No. 7168.
LOWE, H.—"Retort settings for disullation of coal." No. 7330.
LUMB, H.—See Dempster and Sons, Ltd., R. No. 6756.
MALONE, A. J.—See Fox, J. T. No. 7007.
MALONE, J. F. J.—See Fox, J. T. No. 7007.
MARR, A.—See Crossley, T. L. No. 6881.
MARTIN, J. A.—"Grills of gas-stoves." No. 7017.
POULIN, J. T.—See Leblanc, B. No. 7168.
SABEL, G.—"Gas-cookers, &c." No. 6792.
SCHAR, F.—"Gas burners." No. 7182.
THEUMER, R.—See Schar, F. No. 7182.
WALKER, A.—See Drakes, Ltd. No. 7318.
WALKER, A. B.—See Drakes, Ltd. No. 7318.
WILSON, G. G.—"Coke quenching machines." No. 7321.
ZUYDERHOUDT, P.—"Low-temperature carbonization." No. 7262.

MISCELLANEOUS NEWS.

ROYAL COMMISSION ON MINING SUBSIDENCE.

Evidence on Behalf of the National Gas Council.

A public session of the Royal Commission on Mining Subsidence was held on March 19 at No. 5, Old Palace Yard, Westminster. Some weeks ago a *questionnaire* was sent out by the National Gas Council; and the information gathered on the position of the gas industry in relation to mining subsidence was given by Mr. T. P. Ridley, Secretary and Commercial Manager of the Newcastle-upon-Tyne and Gateshead Gas Company. The members of the Commission in attendance were Mr. H. R. Buchanan (who presided), Sir Walter Nicholas (Chairman of the Urban District Councils Association), Lieut.-Colonel G. Wheler, M.P., Mr. Frank Varley, M.P., Lieut.-Colonel G. A. Lewis, Prof. H. Louis, Mr. M. F. Maclean, Mr. J. D. Wallis, Mr. R. G. Ellis, Mr. H. Jevons, and Mr. Nott Bower (Secretary). Mr. W. J. Smith and Mr. E. J. Fottrell, of the National Gas Council, were in attendance.

EVIDENCE OF MR. T. P. RIDLEY.

Mr. RIDLEY explained to the Commission that the National Gas Council comprised both local authority and company undertakings, statutory and non-statutory, representing about 90 p.ct. of the total make of gas in the country. The members of the Council supplied a population estimated at about 35 millions with gas approximating 243,000 million c.ft. per annum. The capital expenditure of these undertakings amounted to £144,000,000.

Having handed to the Commission a membership list of the Council, and explained their objects, he said that, by section 6 of the Gas-Works Clauses Act, 1847, authorized undertakings, which consisted of local authority concerns and statutory gas companies, were entitled to break-up highways for the purpose of laying, renewing, or repairing their mains and service pipes, making compensation for any damage which might be done in the execution of such powers. No "mining code" such as that contained in the Railway Clauses Act, 1845 (now substituted by Part II of the Mines Act, 1923, and the Waterworks Clauses Act, 1847), was applicable in the case of statutory gas companies. Except as regards mains and pipes laid in highways, these concerns appeared to be in the same position as a private individual in regard to structural works.

Statutory gas companies were entitled to support for mains and service pipes; but there was, in fact, an important limitation to this right, which had not, he thought, been referred to in the evidence already given. It was held, in the case of the Normanton Gas Company *versus* Pope, decided in 1883, that, while on the one hand the plaintiffs were entitled to support for their mains and pipes, the landowner on the other hand was entitled, under the concluding words of section 6 of the Act of 1847, to compensation for the burden so imposed upon him. Thus, though the plaintiffs could recover damages by action when any injury was caused to their pipes, the owner of the mines could recover once and for all compensation in an arbitration under the Gas Works Clauses Act for the limitation thus put upon the user of his land. This case was of considerable importance; and Mr. Ridley handed-in copies of the judgment of the Lords Justices in the Court of Appeal. It was important to observe, he continued, that, though it was true that statutory gas companies could obtain damages when these accrued upon each fresh subsidence, this right of action was a somewhat illusory benefit, seeing that the colliery owner might institute arbitration proceedings forthwith for a lump sum to recompense him for the additional obligation imposed upon him in having to support the mains and service pipes of the gas company.

With regard to local authority undertakings, the legal position of these was more difficult to define. All their special Gas Acts incorporated the Gas Works Clauses Act, 1847; but the Public Health Act, 1875 (Support of Sewers), Amendment Act, 1883, was applicable to such undertakings in England and Wales, inasmuch as "sanitation work" was defined by section 2 of this Act to mean, among other things, "lighting," and to include "any fixtures, pipes, fittings, and apparatus connected with the work, and belonging to the local authority." By section 3 the "mining code" was deemed to be incorporated with the Special Gas Acts; and the provisions of the Act itself were made applicable "to every sanitary work" as defined in the Act.

Non-statutory companies operated free from any statutory control, and had not, therefore, any right to break-up highways, but were in the same position as to principal works as a private individual. It appeared from the case of the Normanton Gas Company that non-statutory gas companies could not sue for damage to pipes due to mining subsidence, and were therefore without any remedy against colliery owners in respect of damage so caused—at any rate, when the consent of the owner of the subsoil had not been obtained. The reason for this was that non-statutory companies, having no statutory right to break-up the highways, were not regarded as having any right of support. It should be pointed-out, however, that in practice it was necessary for them to obtain the consent and approval of the local authority within whose area they were supplying gas before they could break-up the highways.

Gas undertakings suffered considerable damage in mining areas owing to subsidence. This damage fell under four heads: (*a*) Damage to retort-houses, gasholders, &c.; (*b*) damage to mains and service pipes; (*c*) loss of gas; and (*d*) the liability to third parties for injury caused by escapes of gas. Particular attention was called to the item "lost gas." In many cases this was extremely serious, representing a considerable percentage of the total make. It was suggested that the members of the Royal Commission might visit a few of the undertakings in the districts most affected, in order that they might see the damage for themselves. At this stage Mr. Ridley submitted a list of some of the undertakings affected; and the following is a summary of the damage wrought in the Manchester, the Midland, the Northern, the Scottish, and the South Wales districts.

	Damage to Structural Work.	Damage to Mains and Pipes.	Loss of Gas Attributable to Mining Subsidence.	Money Loss.
Manchester District	Considerable damage has been experienced ranging from £500 to £3500.	Very considerable damage, ranging from £55 to £2000.	Between 2·3 and 20 p.ct. In the latter case the money loss is estimated at £727 per annum.	Money loss is considerable, though difficult to estimate. In some cases it amounts to between £150 and £750 per annum.
Midlands District	Considerable damage has been done, in one case amounting to £2460.	Very considerable damage. In one case the estimated cost is £2000.	Ranges between 5 and 12 p.ct. of total make.	Estimated at between £25 and £1500 per annum.
Northern District	Some damage has been experienced.	Considerable damage, amounting to £10 to £837 per annum, exclusive of loss of gas.	Estimated at between 2 and 5½ p.ct of total make.	Considerable loss, ranging from £25 to £837. Loss of gas in one instance estimated at £7813 per annum.
Scottish District	Damage in one case estimated at £1000.	Considerable damage, amounting to from £40 to £6000. Expenditure in one case equivalent to ½d. per 1000 c.ft.	Between 2 and 8 p.ct. of total make.	Considerable loss, ranging from £260 to £1300 per annum.
South Wales District	Serious damage, in one case estimated at £1100.	Serious damage, the cost of which is estimated from £1137 to £3410 per annum.	Between 4 and 22·49 p.ct. of total make.	Ranges from £20 to £34,801 per annum — exclusive of loss of gas.

The National Gas Council had had an opportunity of considering the proposals made by Mr. Blackburn on behalf of the water interests, and he was authorized to state that the Council generally agreed with them. It was suggested:

(*a*) That authorized undertakings (whether local authority or statutory companies) should receive from the mining industry full compensation for the damage done on the basis of the cost of repairs and for reinstatement, together with compensation for loss of gas, and third party claims for damages caused by escapes of gas due to mining subsidence, and that the machinery for settling questions of compensation due to subsidence should be cheap and expeditious.

(*b*) In the case of principal works, gas undertakings (whether local authority or statutory companies) should have the right to purchase coal for protection purposes by agreement with the coal owner, or, failing agreement, by reference to some tribunal.

It was submitted that the same treatment should be meted out to non-statutory gas companies, as these were carrying out a public utility service in the same manner as authorized undertakings, and could only continue to operate so long as they conformed with the requirements of their local authority. The provisions of the Mines (Working Facilities and Support) Act, 1923, had been considered; and it was submitted that they should not be made applicable to gas undertakings.

CROSS-EXAMINATION OF MR. RIDLEY.

Mr. Ridley was then cross-examined by the Chairman. He explained that he regarded 6½ p.ct. as the normal loss of gas. This figure had been obtained from the Official Book which comprised about 33 undertakings in different parts of the kingdom. The amount in excess of this figure he attributed to mining subsidence. Speaking generally in regard to gas-works, the damage was more in connection with mains than with structural works.

The CHAIRMAN suggested that this might be because the structural works were usually in inhabited areas. He asked if the gas authorities—whether statutory or non-statutory bodies—paid wayleaves for their pipes and mains.

To this question witness replied that this was not the case in public highways, but that they paid rates. In the case of private property wayleaves were paid.

Glancing over the figures relating to the Glasgow undertaking, the Chairman said that the damage to mains was estimated at £700 per annum, while the loss due to unaccounted-for gas amounted to £35,451. Thus, speaking generally, the structural damage, and that to pipes and so on, was really trifling compared with the loss of gas. Mr. Ridley agreed to this. In any particular case, suggested the Chairman, assuming there was liability on the mineowner to compensate a gas undertaking for loss of gas caused by mining operations, it would be almost impossible to estimate this loss with accuracy. Witness answered that this was difficult, but that the damage done to pipes was easily assessed. It was really in respect of the cost of repairs to mains that they asked for compensation, together with an estimate of the loss of gas, which would have to be a matter of some scale agreement.

The CHAIRMAN remarked that the claim for damage to mains and pipes was modest enough; but in regard to unaccounted for gas it was a very big matter, and they were in the region of wide speculation.

In reply to Mr. Maclean, witness said that the mining industry should compensate for any damage done to gas-works.

Mr. MACLEAN said that the Commissioners had heard from other sources, such as waterworks and tramways, the same thing. Let them suppose that a pool was established for meeting this, that the rate was 1d., and that the gas industry's share was ½d. If the cost of coal production were raised 1d., it would be a charge on the consumer eventually. For the sake of ½d., which was the gas-works' share, were they prepared to pay 1d. per ton more for coal?

Witness said that, if those were the correct figures, they would not be so prepared. In his opinion, the individual colliery that did the damage should pay the cost of repairs.

Mr. MACLEAN remarked that they were getting into a vicious circle if they suggested that the colliery owner should compensate them with money which eventually would have to come out of the public pocket.

Witness mentioned that this was done in some cases now.

Regarding Mr. Ridley's suggested remedies, Mr. ELLIS said that, by the inclusion of third-party claims in an action, it could neither be cheap nor expeditious.

Witness said that by the expression "third-party claims" he had in mind the damage due to the explosion of escaped gas due to subsidence. If the gas undertakings were held liable, the amount should be charged to the coalowner.

Mr. ELLIS remarked that many difficulties arose out of this simple statement, which would make expedition impossible, and, in consequence, cheapness also.

Lieut.-Colonel WHELER asked whether those undertakings situated near collieries got their coal at a cheaper rate. To this witness replied that, though this was so, these undertakings were expected to sell gas cheaper, and their standard prices were fixed at a lower rate on account of this feature.

Lieut.-Colonel WHELER: In the case of the older gas companies, it is possible that, owing to the works not being up-to-date, there may be considerable escapes of gas?

Witness: Yes.

Lieut.-Colonel WHELER: Therefore the figures submitted could not be used as an actual guide?

Witness replied that he had not stated the percentage as absolute leakage due to mining subsidence.

Lieut.-Colonel WHELER asked whether witness supported the idea of a Mining Subsidence Compensation Tribunal.

Witness said that some form of settling who had to pay in the event of a dispute, and the amount to be paid, was essential.

Lieut.-Colonel LEWIS asked whether there were any comparative figures between the price of gas charged by gas undertakings in colliery districts and those outside mining areas?

Witness replied that the variations in price had been so great during the past twelve months that no reliable guide existed.

Prof. LOUIS remarked that the percentage of unaccounted-for gas, put down to subsidence, in Glasgow and Motherwell, was practically identical. He suggested that there was far more coal mining and subsidence in Motherwell than round about Glasgow. Taking another example, that of Sunderland and Tynemouth, though in the former place there was far more subsidence, the figure given for loss was actually less than that for Tynemouth.

Witness said that the Sunderland Gas Company had spent much more than was usual on the repair of mains.

Prof. LOUIS suggested that, if the gas industry intended to throw the burden of repairs on the mining industry, the latter would have something to say regarding the construction of gas-works.

The CHAIRMAN said that the figures given for unaccounted-for gas did not impress him. He would like to have further details. The execution of gas companies' works was in their own hands.

The Inquiry was adjourned to Tuesday, April 29.

ALLIANCE AND DUBLIN CONSUMERS' GAS COMPANY.

Half-Yearly Meeting.

The Half-Yearly Meeting of the Company was held on March 26—Mr. F. J. DICKENS presiding.

Mr. DICKENS expressed deep regret at the absence of Mr. John Murphy (Chairman of Directors), whose indisposition and advancing years had led to his decision to retire from the Chairmanship. Though confined to the house, Mr. Murphy continued to manifest a keen interest in the affairs of the Company. In Mr. Murphy's address he mentioned the loss sustained by the death of their esteemed friend and fellow-director the Right Hon. Lawrence A. Waldron, P.C.

Turning to the accounts, the figures submitted were of a satisfactory nature. The salient features of the half-year's working were an increase of 6¾ p.ct. in the total quantity of gas sold, a reduction in several of the principal items of expenditure, and a satisfactory improvement in revenue profit. During the year they had secured 2449 new consumers; while no less than 834 new services had been laid. After protracted negotiations, an amicable settlement with the representatives of labour had been reached, resulting in a reduction of 6s. per week in the rates of wages payable to their employees. This, and other savings, had enabled them to reduce the price of gas by 2d. per therm as from the reading of meters for the December quarter. The reductions since the beginning of 1922 amounted to no less than 35 p.ct., or, expressed in another way, the price of gas to-day was only 40 p.ct. above pre-war level. Proceeding to the revenue account it was gratifying to find a reduction, as compared with the corresponding half-year, of no less than £8000 in the cost of coal and oil, particularly as 10,000 tons more coal had been carbonized. There was an improvement in the receipts for coke and breeze amounting to £13,000. The income from tar had also increased; but there was a falling-off under the head of sulphate, owing to the high prices which had been ruling for acid. The cost of purification was down by £1000. The only other item relating to manufacture which called for any special comment was that of repair and maintenance of works, which showed a decrease of nearly £14,000. They had found it necessary to place a contract for

a new gasholder of 3 million c.ft. capacity. The net income from sales of gas was lower by over £26,000. Expenditure for the half-year was down to the extent of £20,000, while the income was less by £9000, and thus they were enabled to carry into net revenue account a profit larger by almost £11,000. The balance of net revenue available, £66,530, would permit of the maximum statutory dividend of £7 10s. p.ct. per annum being paid, but the Directors could not recommend on this occasion a larger dividend than 6 p.ct., which would make 5¾ p.ct. for the year. A balance of £8335 remained to be carried forward to the next account.

Mr. Augustine Bond seconded the adoption of the report and statement of accounts.

Dividend.

On the motion of Mr. Dickens, seconded by Mr. W. H. Davies, a dividend was declared at the rate of 6 p.ct. per annum, less income-tax, on the consolidated stock of the Company.

The Retiring Chairman.

Mr. Dickens moved: "That this meeting of shareholders learns with regret of the retirement of Mr. John Murphy from the Board, and desires to place on record its deep and sincere appreciation of the valuable services he has rendered to the Company during the 37 years he has held office as a Director."

Mr. G. W. Norman seconded the resolution.

At a subsequent meeting of the Board of Directors, Mr. M'Veagh, in proposing that Mr. F. J. Dickens, J.P., be elected Chairman, in succession to Mr. John Murphy, whose resignation from the Board they all deplored, said that not only was Mr. Dickens an Irishman by birth, but he was one of the men who came to the aid of the Company at a critical stage of its fortunes, and piloted it to success.

The Right Hon. James M'Mahon seconded the motion, which was adopted unanimously.

NEWARK GAS-WORKS PURCHASE SCHEME.

An important announcement was made at a meeting of the Newark Town Council with regard to the transfer of the undertaking of the Newark Gas Company to the Corporation.

Alderman J. Priestley (the Chairman of the Gas Committee), in outlining the scheme, said the decision of the Corporation to acquire the concern was the culmination of three years' negotiations. He pointed out that Mr. Wilkinson, the Gas Engineer to the Nottingham Corporation, was called in to assist the Committee, who were satisfied that the works were in good condition. The Committee's terms of purchase had already been accepted by the Directors of the Company. The total cost of the gas undertaking was agreed to as £134,000; and deducting the liquid assets of £10,621, the total cost would be £118,388. The purchase price was arrived at by guaranteeing to the shareholders of the Gas Company the same income which they would receive as standard dividends from the Company. The shares were to be transferred to the Corporation as Corporation stock on a 5 p.ct. basis, which meant that class "A" shares of a total value of £5000, bearing interest at the rate of 10 p.ct. would be converted into Corporation stock of the total value of £10,000 bearing interest at 5 p.ct. Class "B" shares of the value of £5000 bearing interest at 5 p.ct. would be transferred at par; and the ordinary shares, amounting to £37,800 carrying interest at 7 p.ct., would be transferred as £52,920 Corporation stock at 5 p.ct. The mortgage of £7500 would be taken over by the Corporation, and preference shares amounting to £25,000 at 7 p.ct., redeemable in 1926, would be taken over at the same price and at the same rate of interest. The five Directors of the Gas Company would be compensated on a five years' basis, the total amount under this head being £1926. The Corporation would be responsible for the half-year's dividends of £2500, and also for the payment of £2500 on account of the reserve fund. The liabilities amounted to £26,653 and the assets to £15,621, which brought the total purchase price to £118,388. It was not anticipated, observed Alderman Priestley, that the rate would be affected by the purchase; and it had been agreed to take over the staff of the Gas Company at their present salaries. The Corporation's policy would be to provide a sinking fund for the redemption of capital, and therefore the capital charges would be gradually reduced and the consumers would benefit eventually by the reduced cost of gas. He mentioned that if the Corporation purchased the gas-works, they would take over the undertaking as from Dec. 31 last.

The matter was discussed, and eventually it was resolved that the members of the Corporation should have further time to consider the terms, and that a special meeting of the Council should be held later to give a definite decision on the scheme. At present the price of gas in Newark is 5s. per 1000 c.ft., but it was announced that this will be reduced by 3d. per 1000 c.ft. next quarter.

Cheaper Gas at Consett.—The Shotley Bridge and Consett District Gas Company give notice that, from April 1, the price of gas will be reduced from 1s. 1·2d. to 1s. per therm, with a discount of 6d. per 1000 c.ft. for prompt payment. The proposed change constitutes a reduction in the price of gas equivalent to 6d. per 1000 c.ft.

Coal Prices and Gas.—It is stated that to grant the miners' full demands would entail an increase in the price of coal to the industrial and domestic consumer. Mr. Hodges has spoken of an increase of 2s. 6d. per ton. Others of the miners' leaders have mentioned the more probable figures of 3s. and 3s. 6d. The gas companies of the kingdom are among the largest consumers of coal; and Mr. D. Milne Watson, President of the National Gas Council, interviewed on the effect of a rise of (say) 3s. a ton in the cost of coal, indicated that this would entail an additional annual expenditure of £1,500,000 to gas consumers. "For every 1s. increase in the price of coal," said Mr. Watson, "the cost of gas manufacture will be increased by no less than £900,000 per annum; and even if it were found possible to recover some of this increased cost by increasing the selling price of coke, a considerable amount would remain to be found by the gas consumer."

GAS REGULATION ACT APPLICATIONS.

There have appeared in the "London Gazette" the following further notices regarding applications to the Board of Trade under the Gas Regulation Act.

Hindley Urban District Council.

The maximum price now authorized in respect of the supply of gas by the undertakers is 5s. per 1000 c.ft.; and the price they have asked the Board of Trade to substitute for this is 15·17d. per therm.

It is also proposed that additional charges per therm should be authorized in respect of gas supplied through a prepayment meter, varying according to whether such meters are with or without fittings.

SPECIAL ORDER.

Stockton-on-Tees Corporation.

Application is intended to be made by the Corporation to the Board of Trade for a Special Order to enable them to utilize additional lands for gas purposes, to provide for the transfer to the Corporation of the Yarm Gas Company, Ltd., to extend the limits of supply, to authorize the borrowing of further money, and for other objects.

DECLARATIONS OF CALORIFIC VALUE.

Dover Gas Company.—475 B.Th.U. (July 1.)

Knottingley Gas Company.—450 B.Th.U. in substitution for 425 B.Th.U. (July 1.)

GAS REGULATION ACT ORDERS.

The Director of Gas Administration has forwarded a copy of the following further Order made by the Board of Trade under section 1 of the Gas Regulation Act.

Dumbarton Corporation.

The Order is in the usual terms, but with no price figure inserted. Prepayment meter clauses are included. (March 24.)

THE COAL SMOKE ABATEMENT SOCIETY.

Annual General Meeting.

The contribution by the gas industry to the problem of diminishing the smoke nuisance was referred to by speakers at the Annual General Meeting of the Coal Smoke Abatement Society, held at the Royal Society of Arts, Adelphi, London, on Wednesday, March 26, under the Chairmanship of Lord Newton.

The Chairman, in his opening remarks, confessed, to those interested in the problem of smoke abatement, that he did not feel able to congratulate them upon the present position. Though intelligent people had realized that the burning of raw coal was a very stupid, senseless, and dirty proceeding, all their efforts were practically vain unless the Government could be induced to embark upon legislation. Up to the present the Society had never been able to convince any Government that there were any votes to be got out of smoke abatement. Dealing with the work of the Departmental Committee on Smoke Abatement, over which he had presided, he said that the Committee could never get anybody to take the smallest interest in their proceedings. Less attention had been paid to them, apparently, by the Ministry of Health than by anybody else. The Ministry had appointed the Committee, and then practically repudiated responsibility for what they had done. They had continued in this attitude, and persisted in sanctioning housing schemes in which they paid no sort of attention to the question of smoke abatement. The cost of sanitary services alone by the Ministry was something like £23,000,000 a year; and one would suppose that the question of smoke, which affected the well-being and comfort of millions of their fellow-countrymen, would be treated with some sympathy at their hands. As the result of the pressure brought to bear upon them by the Society, the Ministry had introduced Smoke Abatement Bills in 1922 and 1923; but in each case they were introduced at the fag-end of the session, when it was known that they could not be passed. They had had enough of this foolery, and were entitled to a Bill. He asked for support in persuading the Government to bring in a Bill which would do something, if not very much, to remove a national disgrace.

The annual report of the Society, which was adopted, dealt with the development of the smoke abatement movement, the work of the Departmental Committee, and the Smoke Abatement Bills, which fell short of what the Society deemed to be necessary. It drew attention to the provision in the 1922 Bill (which has been discussed from time to time in these columns) that it should be deemed a defence for a person charged with sending forth smoke from factory chimneys in such quantity as to be a nuisance to show that he had used the best practical means for preventing the nuisance. This defence would have applied even to black smoke, and the Society felt that it would weaken rather than strengthen the law. A provision in the 1923 Bill was also mentioned as being viewed with misgiving. This proposed to add largely to the list of industrial processes exempted from the provisions of the Public Health Act, 1875 (this Act exempts mine-shafts and certain specified metalliferous processes), but to enable the Minister of Health, after five years, by Provisional Order, to exclude from such exemption any of the processes specified in the Public Health Act, or any of those proposed to be added. It was also mentioned that the Society had prepared a draft Bill to give effect to their views; and it is intended to have it introduced into Parliament, if the Government cannot be prevailed upon to give legislative effect to the recommendations of the Departmental Committee on Smoke Abatement.

The need for financial aid was demonstrated by the fact that in 1923 the income in subscriptions amounted only to £79 17s. 6d., and in donations to £109 11s.; and it was pointed out that with such limited

means the Committee could not undertake any sustained or vigorous campaign. It is felt that there has never been a more propitious moment for a strenuous effort to reap the fruits of the agitation so long conducted. The mind of the community was impressed by the remarkable change brought about by freedom from smoke during the last coal strike; and it is believed that the public would now accept legislation restricting the use of bituminous fuel in badly-equipped, over-worked, or inefficiently staffed factories.

Attention was also drawn in the report to the great loss sustained by the death of Sir William Richmond, who was largely concerned in the formation of the Society in 1899, and who remained its President until his death.

A resolution, by which the meeting pledged itself to support the efforts of the Society to diminish the smoke evil, was then submitted, and carried. It was proposed, seconded, and supported by Mr. G. BERNARD SHAW, Dame HELEN GWYNNE-VAUGHAN, and Dr. H. A. DES VOEUX (Hon. Treasurer of the Society) respectively, all of whom urged the importance of the creation of a strong public opinion on this matter, in order to get the machinery of the Government moving. Dr. des Voeux made an appeal for funds. He pointed out that subscribers had ceased to subscribe when the war commenced, and the Society were just able to keep going, largely through the kindness of Mr. L. W. Chubb, the Secretary, who had worked for little or no salary, and of the Commons Preservation Society, who had allowed the use of their offices for a small pittance a year. He pointed out that it was hoped to be able to appoint an Inspector, as before the war, to travel over London and report to the Committee smoke nuisances he had observed. Before the war, if there was a smoke nuisance of more than 10 minutes in an hour, it was reported to the local authority concerned, which was urged to take action; and, as a result, the atmosphere of London was improved. In the course of his remarks, Dr. des Voeux said he lived in the country, and wished he could get a supply of gas. The advantages of a smokeless fire were so great that no sane person could ever wish to fall back to the old dirty habits.

In another resolution, the meeting called upon the Government to give early legislative effect to the recommendations of the Departmental Committee on Smoke Abatement. Mr. PERCY ALDEN, M.P., who proposed it, had had several interviews with the Minister of Health, who had pointed out that there was great pressure of business, that a private member's Bill had no chance, and that the Government were not likely to be able to introduce a Bill of their own. Mr. Alden referred to the improvements which had been brought about in the poorer districts of London, where the old-fashioned coal cooking range had been taken out, and a gas-cooker substituted. If only they could get a universal use of gas or other smokeless fuel, the problem would be practically solved. They ought to have a dozen or so Government inspectors going about the country, stirring up local authorities to administer the law. He would do all he possibly could to back-up the Society, and would not let the matter die while he was in the House. He promised Mr. Wheatley a most unpleasant time if he failed to do anything. Finally he suggested that, as the domestic fire contributed so much to the smoke nuisance, local authorities should, in cases where a householder was prepared to use non-smoke-emitting appliances, such as gas, make a slight reduction in the rates payable by that householder

Another champion of gas was Col. Sir ARTHUR HOLBROOK, Bart., who seconded the resolution. When he first came to London he abolished the kitchener, and put in a gas-stove, heated water by means of a coke boiler, and heated the rooms with gas-fires.

On the motion of Sir W. NAPIER SHAW, F.R.S., and Col. R. E. CROMPTON, Lord Newton was elected President of the Society, and the present Vice-Presidents, Council, and officers were re-elected. Sir W. Napier Shaw urged that they should not proceed to deal with the smoke nuisance by prohibition methods, because by so doing they would challenge the ingenuity of smoke "bootleggers" throughout the country. The way to solve the problem was to find means of securing agreement to an arrangement which would make it worth the while of those concerned to avoid smoke emission.

Rotherham Gas Prices Lowered.—The Gas Committee of the Rotherham Town Council have decided to reduce the price of gas for all purposes by 0·8d. per therm, equal to 4d. per 1000 c.ft.

Retford Gas Price Reduction.—At a meeting of the Retford Town Council last Friday, the Gas Committee recommended a reduction in the price of gas from 3s. 10d. to 3s. 4d. per 1000 c.ft. Alderman Williamson explained that in two years the price of gas at Retford had been reduced by 1s. 8d., which meant a loss of £8000 on the profits made by the concern. The recommendation was approved.

Guildford Gas Light and Coke Company.—At the half-yearly meeting of the Company, held on March 27, the Chairman, Mr. F. F. Smallpiece, J.P., in moving the adoption of the report, said that the balance standing to the credit of profit and loss account was £13,158, out of which it was proposed to pay dividends as follows: On the preference stock at the rate of 5 p.ct. per annum, and on the ordinary stock at the rate of 6½ p.ct. per annum. This would leave £8747 to be carried forward. The reserve fund stood at £9859. The sale of gas showed an increase of 6,839,000 c.ft. on the corresponding half year, equal to 5·2 p.ct. Mr. Wm. Titley (Secretary) tendered his resignation, owing to failing health. He has served the Company for 39 years, for 28 of which he was Secretary. The Chairman and several shareholders spoke in affectionate terms of Mr. Titley's long and faithful service; and it was unanimously decided to grant him a retiring allowance. The duties of Secretary had been taken over by the Engineer and Manager (Mr. E. L. Nicholas) until a definite appointment is made in this direction. The Chairman mentioned that a large sum had been expended on works repairs and maintenance. Three beds of retorts had been entirely reconstructed. New condensing and washing plant and a rotary meter for carburetted water gas had been installed, and a new boiler-house and chimney stack built. The sulphate of ammonia plant had been completely reconstructed on modern lines and was now producing neutral salt. The showroom had been remodelled and decorated, and the sales of apparatus had considerably increased.

THE NORTH-EAST COAST COAL TRADE.

From our Own Correspondent.

Towards the end of last week, the Newcastle market became what may best be described as a "strike market." From the beginning, the tone was firmer, and at the end of the week inquiry from abroad came on, and, added to the steady home demand for stocking, made business and prices a matter for negotiation, with available coal in very short supply.

It is still very uncertain what the outcome of the dispute may be. Two facts stand out. First, by not making the ballot a "strike ballot," the rejection of the owners' offer, which is fairly certain on the recommendation given, can be secured by a clear majority, instead of the two-thirds which would have been necessary. Secondly, the date on which the ballot is returnable is ominously near to the date on which the present agreement terminates. What is to happen in the intervening week, assuming that the terms are rejected, is not yet clear.

All attention on the market is at present concentrated on the immediate future, and forward business beyond the end of April is quiet. Best gas and Wear specials finished the week at a nominal quotation of about 25s. 6d. f.o.b., and seconds 23s. to 24s. But business is not so much a question of prices, as being able to arrange loading trims for this month, and especially for the first half. Plenty of tonnage is available and in sight, and trims becoming very full.

YORKSHIRE AND LANCASHIRE COAL TRADE.

From Our Local Correspondent.

With the possibility of a miners' strike still to be reckoned with, the demand for all descriptions of fuel in Yorkshire and Lancashire continues to be unusually large. At the majority of collieries prices remain firm. House coal is in urgent request, by consumers; but prices have not been advanced to any considerable extent by the distributors. On the other hand, several collieries have obtained prices far in excess of those which have operated recently. Industries appear to be putting coal into stock, which may mean a slight decline in their requirements when a settlement takes place.

Gas coals are not in excessive demand owing to the lengthening days and the approach of "Summer Time"; but it is stated that prices will be increased for future contracts. Gas companies have already paid higher prices for recent current supplies outside contracts.

The shipping industries are not quite so busy as they were some weeks ago, probably owing to the high rates of exchange now operating to the nearer Continental countries. This is probably to the advantage of the British consumer, because if the export trade was in urgent need of fuel it is difficult to see where supplies could be obtained.

Nominal prices at Hull on Thursday were: Bunkers-Yorks, Derby and Notts large screened steam, f.o.b. Humber ports, 27s. 6d. to 29s.; cargo for export, f.o.b. usual shipping ports; best Yorks hards, Association, 33s.; Derby best hards; 31s. 6d. to 32s. 6d.; West Yorks. Hartleys, 29s. to 31s.; South Yorks. washed doubles, 29s. 6d.; ditto washed singles, 29s.; dry doubles, 25s. to 25s. 6d.; South Yorks. washed smalls, 22s. 6d.; Derby slack, 1 in., 17s. 6d.: South Yorks. rough slack, 18s. 6d. to 19s. 6d.; gas coke, 41s.; foundry furnace coke, 31s.; washed smithy peas, 30s. to 32s.; washed steam thirds, 28s. 6d. per ton.

In Lancashire, up to 37s. per ton is quoted for best house coal and 26s. for unscreened industrial coal. Slacks range from 17s. to 20s. per ton.

COAL TRADE IN THE MIDLANDS.

From Our Local Correspondent.

The position in the Staffordshire and Warwickshire coalfields is one of great stringency. Adequate supplies are not coming through from the collieries, although full time is being worked. There is still a considerable amount of absenteeism on account of sickness, with the result that production is diminished to a point that demand cannot be met. The unsettled wages question is driving people on the market for extra supplies to add to stocks. Householders, however, are displaying no signs of panic. The fact that they are facing summer instead of winter is a reassuring factor.

The settlement for the time being of prices for furnace coke has afforded satisfaction, although users are looking for some relief in May, when rates again come under review. Gas coke continues to retain its strong position. There is pressure for deliveries of all descriptions of industrials, and the recent enhanced values are upheld. Wagons are promptly emptied as they arrive at the wharves and returned to the collieries, where delay often occurs owing to inability to reload.

Further Reduction at Wolverhampton.—The Wolverhampton Gas Company are further reducing the price of gas as from the reading of the meters for the Lady Day quarter. The new prices will be as follows: For lighting and domestic purposes, from 9·5d. to 9·27d. per therm; for power purposes, from 6·8d. to 6·57d. per therm; for prepayment meters, from 12·2d. to 11·7d. per therm.

Leamington Priors Gas Company.—At the ordinary general meeting of the Company—Dr. Harold Mason presiding—the payment of the statutory dividends was recommended. Before moving the adoption of the report and accounts, the Chairman referred to the loss which the Company had sustained through the death of their late Chairman, Alderman T. W. Thursfield, M.D., J.P. With regard to the accounts, he wished to draw attention to the decrease of £2400 in the receipts for gas. This did not represent any falling off in the quantity sold, which was greater than in the corresponding half-year of 1922, but showed the extent to which their customers had benefited by reductions in price.

TRADE NOTES.

Savings in the Cookery Bill.

A booklet published by The Davis Gas Stove Company, Ltd., of 60 and 62, Oxford Street, W. 1 (members of Radiation Limited), shows how substantial savings can be made in the gas-cooking bill. It describes in an interesting way the "New World" cooker, the "Alpine" range, and the "Pennine" range.

A New Recipe Book.

Messrs. Radiation Limited have published a small "Ten-Minute" Recipe Book, which will be sent free to inquirers. In this selection of useful hints, a few pages dealing with the "New World" cooker have been introduced. The booklet has been made as attractive as possible by the inclusion of just the sort of information that appeals to the modern housewife.

Brownhills Chemical Works.

The Brownhills Chemical Works Company, near Walsall, has been in the Lane family for nearly half-a-century; but in order to further the interests of tar distilling, and successfully to combat foreign competition in the sales of products, an amalgamation of their Midland tar distilling interests has been effected with Messrs. Robinson Brothers, Ltd., Messrs. Lewis Demuth & Co., Ltd., Messrs. Major & Co., Ltd. (of Wolverhampton and Chesterton), and Messrs. Joseph Turner & Co., Ltd. (of Queen's Ferry), under the name of the Midland Tar Distillers, Ltd. Mr. J. Reginald Lane joins the Board of the Midland Tar Distillers, and the business of what will henceforth be known as the Brownhills Chemical Works Branch will be carried on as hitherto.

Dedication and Unveiling of a War Memorial at Portslade.—A memorial to the employees of the Brighton and Hove Gas Company who fell in the war was dedicated by the Bishop of Lewes, and unveiled by Mr. A. M. Paddon (Chairman of the Directors), on March 22. The memorial takes the form of a slab of reddish granite with a background of white stone. In relief on the granite are a bronze cross and the arms of Brighton and Hove. Underneath is a bronze plate bearing the names of the fallen.

Accrington Gas Regulation Act Order.—The Clerk reported to the Accrington District Gas Board on March 27 that the Order under the Gas Regulation Act for extending their area of supply to Whalley and part of Billington had received the approval of Parliament without question. Application would now have to be made to the Ministry of Health for the necessary borrowing powers. The estimated cost of erecting a new spiral gasholder at Whalley was £8000. The Chairman expressed gratification at the way in which the Order had been got through. The Clerk said the Board would acquire the Whalley undertaking on Oct. 1.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

London, *March* 31.

In the tar products market pitch remains inactive, and the price is nominal. Fair quantities of tar are already going out for road work, and with the lower prices prevailing, as compared with the past year or two, a considerable demand is expected this season. Creosote is quiet at about 9¼d. per gallon net and naked. Tar spirits and other products are without change.

Tar Products in the Provinces.

March 31.

The market for pitch has been very quiet during the past week; no sales of importance being reported. Foreign consumers are holding off the market for next season unless they can purchase at a discount.

The average values for gas-works products during last week were: Gas-works coal tar, 48s. 3d. to 53s. 3d. Pitch, East Coast, 60s. to 62s. 6d. f.o.b. West Coast—Manchester, 52s. 6d. to 55s.; Liverpool, 53s. 6d. to 56s.; Clyde, 54s. 6d. to 57s. Benzole 90 p.ct., North, 1s. 5d. to 1s. 6d.; crude 65 p.ct. at 120° C., 1s. to 1s. 1d. naked at makers' works; 50-90 p.ct., naked, North, 1s. 8d. to 1s. 10d. Toluole, naked, North, 1s. 5d. to 1s. 6d., nominal. Coal tar crude naphtha in bulk, North, 7½d. to 8d. Solvent naphtha, naked, North, 1s. 2d. to 1s. 2½d. Heavy naphtha, North, 1s. 2d. to 1s. 3d. Creosote, in bulk, North, liquid, 8d. to 8¼d.; salty, 7⅞d. to 8d.; Scotland, 7½d. to 7⅞d. Heavy oils, in bulk, North, 9d. to 9½d. Carbolic acid, 60 p.ct., 2s. 1½d. to 2s. 4½d. prompt. Naphthalene, £15 to £16; salts, £6 to £8, bags included. Anthracene, "A" quality, 4d. per minimum 40 p.ct., purely nominal; "B" unsaleable.

Wollaston Gas-Producers (Manchester), Ltd., is the title of a Company registered to carry on business as manufacturers, designers, and suppliers of, and dealers in, gas and chemical plant machinery and equipment, &c. The capital is £1000, in £1 shares.

Gas Exhibition at Thornton.—An interesting exhibition has just concluded at Thornton-le-Fylde, where the Urban District Council Gas Department showed much enterprise in bringing the advantages of gas for heating and cooking before the notice of their consumers. The exhibition ran for two days at Thornton, and two days at Cleveleys; and an encouraging attendance was maintained throughout. Lectures and cookery demonstrations were held each afternoon and evening, and these proved a great attraction. A complete and comprehensive display of all types of gas-appliances were on view; conspicuous among these being Richmond's "Bungalow" and "Ranelagh" series of cookers, and the "Black Prince" by John Wright & Co., Ltd. These Radiation makers were worthily represented.

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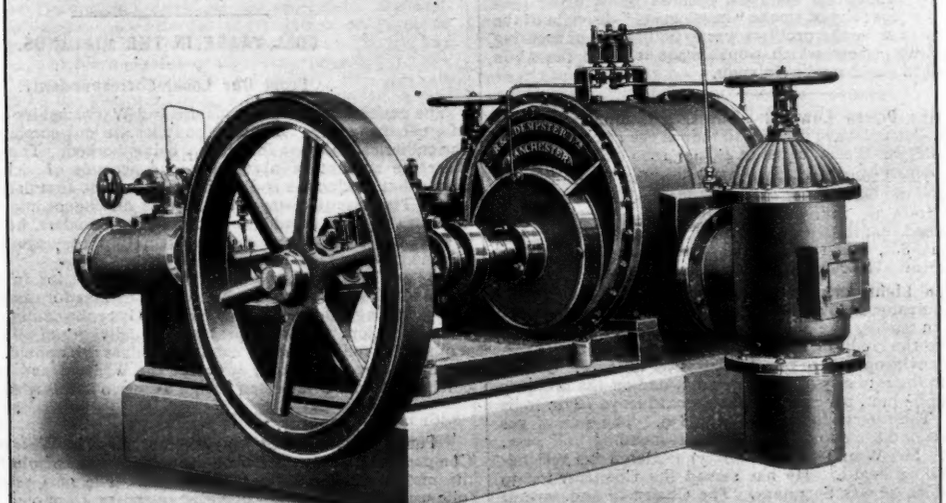

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STOCK MARKET REPORT.

The Stock Markets are beginning to feel the influence of the approaching Budget. It is now known that the Chancellor of the Exchequer has a surplus for the current fiscal year. That there will be certain changes in taxation is clear, but so far an increase in the death duties is the only anticipation that has received credence. The tendency in most markets was to deal sparingly, and such caution is not surprising having regard to the unsettled condition of the labour world.

The Gilt-Edged Market, however, remained firm. The 5 p.ct. War and 3½ p.ct. Conversion Loans each gained about ⅜. There is still plenty of capital available for new issues; both the Siamese 6 p.ct. Loan and the City of Amsterdam Loan were promptly over-subscribed. Business was naturally slack in the Home Railway Market having regard to the possibility of a Tube strike to be followed by a general railway stoppage, but there was a slight recovery on Friday afternoon on rumours of the settlement. Industrials were no exception to the general rule, and small selling led to lower quotations. Shipping issues were dull; Royal Mail declined 2 to 90; while P. and O. deferred closed 5 lower at 285.

Gas Stocks shared in the general depression, but there were few variations in the quotations. Continental Union rose 3 points, to 28 33, European ½, to 6·7, Imperial Continental 3½ p.ct. debenture fell 3, to 69-72, and South Metropolitan 6½ p.ct. debenture rose 1, to 103·105.

The following transactions were recorded during the week; On Monday, Alliance and Dublin 72½, Bournemouth 5 p.ct. £12 19s. 3d., "B" 12⅜, British 118 *ex* div., Commercial 4 p.ct. 91⅛, European 5⅜, 6½, Gas Light and Coke 90½, 90½, 90¾, 91, 3½ p.ct. maximum 60⅛, 60¼, 4 p.ct. preference 77⅛, 77½, 78¼, 78⅜, Primitiva 8s., 5 p.ct. preference 33s. 6d., South Metropolitan 96, 6½ p.ct. debenture 103½, 104, South Suburban 5 p.ct. 98, Swansea 6½ p.ct. debenture 103½, Tottenham "A" 119. Supplementary prices, Barnet "D" 114, 114½, Southgate 10 p.ct. maximum 144, 7 p.ct. maximum 104½. On Tuesday, Bournemouth 6 p.ct. preference 11⅞, Brentford "B" 99, 99½, Cape Town 7½, Commercial 3½ p.ct. 91⅜, Continental 30, European 5⅞, Gas Light and Coke 90½, 90⅝, 90⅝, 90⅝, 91, 91½, 4 p.ct preference 77½, 78½, 78½, 3 p.ct. debenture 59, Imperial Continental 141, 141½, Liverpool 7 p.ct. preference 105 *ex* div., South African 8½, South Metropolitan 96, 96½, 6½ p.ct. debenture 104, South Suburban 5 p.ct. 98½, Tottenham "B" 99. Supplementary prices, Southgate 10 p.ct. maximum 145, 7 p.ct. maximum 105. On Wednesday, Bournemouth 6 p.ct. preference 11⅜ Brentford "B" 99, 99½, Commercial 4 p.ct. 91, 91½, 92, 92½, 92½, 92⅝, 3½ p.ct. 91½, 92, 3 p.ct. debenture 56½, European 6, Gas Light and Coke 90½, 91, 91½, 3½ p.ct. maximum 61½, Imperial Continental 139, 141½, Montevideo 58, Primitiva 8s., 5 p.ct. preference 33s. 6d., South Metropolitan 96½, 96⅝, 97, 6½ p.ct. debenture 104. Supplementary prices, Mid-Kent 4⅛. 3d. On Thursday, Alliance and Dublin 72½, Bournemouth 4 p.ct. debenture 77, 78½, 78¾, Brentford "B" 98½, British 4 p ct. debenture 74, Commercial 4 p.ct. 92½, Continental Union 29, European 6, Gas Light and Coke 90½, 90⅝ 91½, 3½ p ct. maximum 60⅝, 3 p.ct. debenture 60, Imperial Continental 139½, Oriental 101½, Primitiva 5 p.ct. preference 33s. 6d., South Metropolitan 97, 3 p.ct. debenture 59½. 6½ p.ct. debenture 103½. Supplementary prices, Guildford 92, 92½, York 67½. On Friday, Alliance and Dublin 73, 73½, Gas Light and Coke 90½, 90½, 90⅝, 3½ p.ct. maximum 59, 60, 61½, 3 p.ct. debenture 59½, 60, Imperial Continental 140, Liverpool 7 p.ct. preference 104 *ex* div., Primitiva 8s. 4½d, 8s. 6d., South Metropolitan 96½, 3 p.ct. 58½, 6½ p.ct. debenture 104½. Supplementary prices, Brentwood 5 p.ct. preference 80, Liverpool 5 p.ct. 90, Wandsworth new 98.

The tone of the discount market hardened as a result of the tenders for Treasury Bills which were available at an average of £3 1s. 3·3d. p.ct, which was about 3s. 2d. above the rate for the previous week.

Business on the Foreign Exchanges were very restricted. French francs further improved, and closed at nearly four francs better on the week at 78·50. Belgian francs closed at about two francs better at a little below 100. Italian lire was ½ better at 99⅜, and sterling on New York, in which there was very little fluctuation during the week, closed at 4.30⅜.

The Bank rate is 4 p.ct., to which it was raised from 3 p.ct. on July 5. Bankers' deposit rates are 2 p.ct. The deposit rates of the discount houses are 2 p.ct. at call and 2½ p.ct. at notice.

Regarding the letter which appeared last week from Mr. A. C. Pullen, the Secretary of the Colombo Gas and Water Company, Ltd., our Stock Market Correspondent writes: "The transaction to which the Secretary of the Colombo Gas Company refers was recorded in 'The Times' of March 13, and is, so far as I am aware, correct. Mr. Pullen does not indicate in what way the record is inaccurate. It would be interesting to know."

A copy of the foregoing was sent to Mr. Pullen; and he says: "If the quotation in 'The Times' to which your Stock Market Correspondent refers was correctly repeated (and I have no doubt it was), I would mention that 'The Times' must have been in error, because the highest price at which the Company's preference shares have changed hands has been £10 each. I think confusion must have arisen between our ordinary and preference shares."

ANTE-WAR PRICES AND DIVIDENDS, LATEST DIVIDENDS, AND LAST WEEK'S TRANSACTIONS.

Issue.	Share.	When ex-Dividend.	Ante-War Dividend & Bonus.	Last Divid. at Rate of	NAME.	Closing Prices, July 30, 1914.	Variation. Quotations, March 28.	Variation. Lowest and Highest Prices of Transactions.
£			p.c.	% p.a.				
131,978	Stk.	Feb. 7	—	5	Aldershot 5 p.c. max. C.	..	72—75	...
217,992	,,	,,	4	4	Do. 4 p.c. Pref.	..	68—73	...
1,551,868	,,	Oct. 4	2½	5½	Alliance & Dublin Ord.	59—64	70—73	72½—73½
374,000	,,	Jan. 10	4	4	Do. 4 p.c. Deb.	76—77	60—65	...
280,000	5	Oct. 18	7½	8	Bombay, Ltd.	5⅛—6½	5—4⅛	...
100,000	10	Mar. 6	—	8½	Bournemouth Gas and Water: 5 p.c.	..	12½—13½	£19/19/3
					Bournemouth Gas and Water: B 7 p.c.	15—15½	11½—12½	1..⅜
383,110	10	,,	7	7	Bournemouth Gas and Water: Pref. 6 p.c.	13½—14	11—12	11⅜—11⅞
215,000	10	,,	6	6	Bournemouth Gas and Water: 4 p.c. Deb.	..	75—80	77—78½
162,025	—	Dec. 28	—	4	Brentford A Consolid.	..	90—101	
992,045	Stk.	Feb. 21	—	6½	Do. B New	..	96—101	98½—99½
734,920	,,	,,	—	6½	Do. 5 p.c. Pref.	109—111	89—94	...
55,000	,,	,,	5	5	Do. 4 p.c. Deb.	91—93	76—81	...
221,400	,,	Dec. 13	4	4	Brighton & Hove Orig.	208—213	170—175	...
214,740	,,	Mar. 6	11	11½	Do. A Ord. Stk.	154—159	124—127	...
244,300	,,	,,	8	8½	Bristol 5 p.c. max.	..	90—91s	90
1,387,500	Stk.	Feb. 21	—	5	British Ord.	..	118—123*	118
855,000	,,	Mar. 20	—	7	Do. 7 p.c. Pref.	..	120—125	...
100,000	,,	—	—	7	Do. 4 p.c. Deb. Stk	88—90	73—78	74
120,000	,,	Dec. 28	4	4	Cape Town & Dis., Ltd'	1½—2½	6½—7½	...
100,000	10	,,	—	6	Do. 4½ p.c. Pref.	4—6	6—7	...
100,000	10	Oct. 31	—	4½	Do. 4½ p.c. Deb. Stk'	70—75	73—78	...
150,000	Stk.	Dec. 28	4½	4½	Cardiff 7½ p.c. Deb.	..	105—110	...
237,860	,,	,,	—	7½	Chester 5 p.c. Ord.	108—110	85—90b	...
157,150	,,	Mar. 6	5	6½	Commercial 4 p.c. Stk.	106—108	90—95	91—92⅛
1,513,280	,,	,,	5/9/4	6	Do. 3½ p.c. do.	103—105	90—95	91½—92
360,000	,,	,,	5½	6	Do. 5 p.c. Deb. Stk.	69½—71½	56—60	59½
475,000	,,	Dec. 13	5	5	Continental Union, Ltd.	76—79	28—33	29—30
800,000	,,	14 Jan. 15	4	—	Do. 7 p.c. Pref.	115—118	75—80	..
200,000	,,	Dec. 13	7	7	Croydon sliding scale.	..	99—102	...
660,000		Mar. 6	—	6½	Do. max. div.	..	83—86	...
284,975	,,	,,	—	5	Derby Con. Stk.	123—125	108—110c	...
492,270	Stk.	Feb. 21	6	4½	Do. Deb. Stk.	102—104	74—76c	..
55,000	,,	Jan. 12	4	4	East Hull 5 p.c. max.	..	..	..
809,000	,,	—	—	5	European, Ltd.	17½—18	6—7	5⅞—6½
1,002,180	10	Jan. 24	10	2	Gas: 4 p.c. Ord	98—102	90—92	90⅝—91½
16,546,120	Stk.	Feb. 7	4/17/4	5½	Gas: 3½ p.c. max.	76—79	60—63	59—61½
2,600,000	,,	,,	3½	3½	Light and Coke: 4 p.c. Con. Pref.	96—99	77—80	77½—78½
4,062,235	,,	,,	4	4	Light and Coke: 3 p.c. Con. Deb.	72½—74½	57—60	59—60
4,761,930	,,	Dec. 13	3	3	Light and Coke: 10 p.c. Bonds	..	..	...
130,000	,,	Dec. 11	10	10	Light and Coke: 7½ p.c. Ilford Deb.	..	..	...
42,000	—	—	—	7½	Hastings & St. L. 5 p.c.	..	91—96*	...
82,500	,,	Mar. 20	5	6½	Do. 3½ p.c.	87—89	76—81*	...
858,740	,,	,,	3½	5½	Hongkong & China, Ltd.	16½—16¾	16—17	...
70,000	10	Oct. 18	11	10	Hornsey 7 p.c.	..	143—148	...
86,600	Stk.	Mar. 6	9	10	Imperial Continental	150—160	138—143	139—141½
1,076,000	,,	Nov. 15	9	5	Do. 3½ p.c. Deb. Red.	84—86	69—72	...
401,400	,,	Feb. 7	3½	3½	Lea Bridge Ord. 5 p.c.	119—121	92—97	...
235,242	,,	Mar. 6	6½	6½	Liverpool 5 p.c. Ord.	..	89—90b	90
2,127,340	,,	Feb. 21	—	5½	,, 7 p.c. Pref.	..	103½—106½b*	104—105
600,000	,,	Mar. 20	—	7	Maidstone 5 p.c.	..	124—129	...
165,736	,,	Feb. 21	7/5/6	8	Do. 3 p.c. Deb	..	54—59	...
63,480	,,	Dec. 28	—	—	Malta & Mediterranean Met. of Melbourne: 4½ p.c. Deb.	4¼—4½	3¾—3½	...
75,000	5	Dec. 13	6	5	Montevideo, Ltd.	99—101	95—98	...
50,000	100	Oct. 1	4½	4½	Newcastle & Gatsh'd Con.	..	54—59	58
341,920	Stk.	Nov. 29	4	4	Do. 4 p.c. Pref. Stk.	98½—99½	85—86d	...
1,875,892	,,	Mar. 6	4½	5½	Do. 3½ p.c. Deb.	..	73—75d	...
250,166	,,	,,	—	4	North Middlesex 10 p.c.	82—83	71—73d	...
129,705	,,	Dec. 28	3½	3½	,, 7 p.c.	..	16—17	...
15,000	10	Mar. 6	—	11	Oriental, Ltd.	14—15	11¼—11½	...
75,940	10	,,	7/14/0	7/0	Pym'th & Stonh'se 5 p.c.	117—122	97—102	101½
300,000	Stk.	Nov. 29	8	9	Portsea Island, B	..	107—112	...
138,120	Stk.	Dec. 28	—	7½	Do. C	128—131	102—105	...
60,000	50	Mar. 6	13	13	Primitiva Ord.	112—121	98—103	...
100,000	50	,,	12	12	Do. 5 p.c. Pref.	5⅛—6	⅛—⅛	8/—8/6
1,450,345	5	29 Oct. 14	8	—	Do. 4 p.c. Deb.	4⅛—5	1⅛—1⅛	33/6
2,419,800	5	30 Dec. 15	5	—	Do. ,, 1911	91—93	70—75	...
341,400	100	Dec. 3	4	4	Do. ,, 1921	..	54—57	...
600,000	Stk.	Jan. 24	4	4	Do. B. Aires 4 p.c. Deb.	85—87	55—58	...
220,335	,,	Dec. 28	4	4	Do. Riv. Pl. 4 p.c. Deb.	85—87	55—58	...
321,670	,,	,,	4	4	San Paulo: 6 p.c. Pref.	10½—11	5⅞—6⅛	...
150,000	10	Oct. 4	6	6	San Paulo: 5 p.c. Deb.	47—49	37—40	...
125,000	50	Jan. 3	5	5	Sheffield A	..	99—101s*	100½
270,000	Stk.	Mar. 20	—	5/8/4	Do. B	..	99—101s*	100—100½
419,968	,,	,,	—	5/8/4	Do. C	..	99—101s*	...
1,047,000	,,	,,	—	5/8/4	Shrewsbury 5 p.c.	..	..	...
133,201	Stk.	—	4	6	South African	10½—11½	7—9	8½
90,000	10	Oct. 18	9	6	South Met. Ord.	111—113	95—97	96—97
5,609,895	Stk.	Feb. 21	5/9/4	6½	Do. Red. Pref.	..	98—100	...
102,580	,,	Jan. 10	—	5	Do. 3 p.c. Deb.	72½—74½	57—60	58½—59½
1,895,445	,,	,,	5	8	Do. 5½ p.c. Deb.	..	103—105	103½—104½
734,000	,,	Mar. 6	—	6½	South Shields Con. Stk.	157—159	136—138d	...
91,500	,,	Aug. 23	8½	8½	S'th Suburb'n Ord. 5 p.c.	114—116	95—100	98—98½
1,087,795	,,	Feb. 21	6	6½	Do. 5 p.c. Deb. Stk.	116—118	93—100	...
368,837	,,	Dec. 28	5	5	S'th'mpt'n Ord. 5p.c. max	99—102	86—89	...
647,740	,,	Nov. 15	5	5	Do. 4 p.c. Deb. Stk.	..	74—79	...
121,275	,,	Dec. 28	4	4	Swansea 7 p.c. Pref. Stk.	..	100—102	...
250,000	,,	Mar. 6	7	7	Do. 6½ p.c. Deb. Stk.	..	102—104	103½
200,000	,,	Dec. 28	—	6½	Tottenham: A 5 p.c.	135—138	119—124	119
130,000	,,	Feb. 21	—	8	Tottenham: B 5½ p.c.	115—117	98—103	99
882,375	,,	,,	6	6½	Tottenham District: 4 p.c. Deb	87—89	77—81	...
181,255	,,	Dec. 13	4	4	Tynemouth Con. & New	108½—109	84—86d*	...
258,251	Stk	Mar. 20	5	7/14/4	Wandsworth, Wimbledon, and Epsom—			
30,000	..	Mar. 6	8½	9½	Wandsworth A 5 p.c.	151—156	132—137	...
255,636	,,	,,	6½	7½	Do. B 5½ p.c.	139—154	110—115	...
108,073	,,	,,	5/17/3	6/7/9	Do. C	110—115	96—101	...
240,865	,,	,,	—	6/7/9	New Ordinary	..	..	...
852,000	,,	,,	6½	7½	Wimbledon 5 p.c.	117—122	105—110	...
98,000	,,	,,	6½	7½	Epsom 5 p.c.	121—126	112—117	...
88,416	,,	Dec. 28	5	5	5 p.c Deb. Stk.	66—69	56—61	...

Quotations at:—a.—Bristol. b.—Liverpool. s.—Nottingham. d.—Newcastle. s.—Sheffield. * Ex div.

Torquay and Paignton Gas Company.

The annual meeting of the Company was held on March 24. The Chairman of Directors, Major R. P. Kitson, in moving the adoption of the annual report and accounts, said the shareholders had reason to congratulate themselves not only on the prosperity of the Company, but also on the fact that the amalgamation with Paignton had been brought to a successful issue. The accounts showed that amalgamation had benefited the consumers and had given satisfaction to the shareholders. On the combined undertaking, the sale of gas had increased by 2 million c.ft., and the reduction in the receipts was accounted for by the lowering of the price of gas, which was now 10d. per therm, equivalent to 4s. per 1000 c.ft. The Directors had decided to make a further reduction of ½d. per therm to ordinary consumers, and to give a discount of 5 p.ct. to consumers of gas to the value of £100 per annum and over. With regard to amalgamation, the beneficial results which would eventually follow that event had yet to mature. After pointing out that the accounts showed a balance of £22,261 to the credit of the profit and loss account, the Chairman moved that the full year's dividend at the rate of 6 p.ct. per annum on the ordinary stock be declared. This was seconded by the Vice-Chairman, Mr. H. B. Rossiter.

Gas Exhibition at Pontypridd.

A Gas Exhibition was opened at Pontypridd on Tuesday, March 25, under the auspices of the Pontypridd Council Gas Department. It is being held in the Parish Rooms. Two 1600-c.p. "Wembley" lamps, made by Messrs. H. Staniforth & Co., London, provide the light at the gateway. At the entrance to the hall, light is supplied by an 800-c.p. "Littleton" lamp with distant control, by Messrs. Wm. Sugg & Co., Ltd. The lower floor is lighted by three 800-c.p. "Westgate" lamps made by the same firm, and the top floor by an 800-c.p. "Westgate" lamp and a "7501 Bon Marché" fitting, and a "Ukay" lamp manufactured by Messrs. Falk, Stadelmann, & Co., Ltd. On the ground floor, General Gas Appliances, Ltd., of Guide Bridge, are showing various types of gas-fires; these being finished in art black, silver, and gold. Cookers, radiators, portable wash-boilers, grillers, and rings are also on show. Messrs. R. & A. Main, Ltd., are exhibiting their well-known appliances; and other firms include the Parkinson Stove Company, Ltd., and Messrs. Stoves, Ltd. The Pontypridd Gas Department have also an attractive display of cookers, fires, and boilers. On the second floor the Economic Boiler Company demonstrate their "Economic" packed gas-boiler, and combined cooker and wash boiler. Messrs. Burners (1921), Ltd., have an attractive display of burners, including the "New Silent" burner having no air adjustment. Messrs. Falk, Stadelmann, & Co., display a wide range of fittings. The "Walker" automatic flash signs are in operation; Messrs. Willey & Co., George Wilson Gas Meters, Ltd., and Messrs. W. Parkinson & Co. are showing demonstration meters; and an attractive display of fittings is due to Messrs. J. & W. B. Smith, Ltd. It was originally intended that the exhibition should run for one week only; but it has been so successful that the time has been extended to a fortnight.

Gas Price Reduction at Dudley.—As from the Lady-Day meter readings, the Town of Dudley Gas Light Company are reducing the price of gas by approximately 1d. per therm, or 4½d. per 1000 c.ft.

Alleged Coke Weight Fraud.—At Leeds Police Court, on March 27, Harry Jones was remanded on three charges of conspiring to defraud. It was stated that the prisoner and his father, George Jones, were coal and coke dealers, and had been in the habit of buying coke from the Leeds Gas-Works. It was alleged that in about twenty cases the customers to whom they sold coke had been defrauded. In one instance, it was suggested a weigh note of 21 cwt. at the gas-works had been altered to 26 cwt. when handed to the customer, in addition to which the defendant had left nine bags of coke in a back street, and the weight of the cart had been put down on the customer's note at a reduced figure, so that the customer had been defrauded in three different ways at the same time.

Worthing Gas Capital Issue.—The issue of £20,000 of 5½ p.ct. irredeemable preference stock lately offered by Messrs. A. and W. Richards for the Worthing Gas Light and Coke Company was considerably over-subscribed. The tenders ranged from £105 down to the minimum of £95 per £100, and the stock was allotted at an average price of £96 10s. 1d. p.ct.

Leeds Stove and Meter Rents.—The Leeds Gas Committee have decided on an arrangement whereby the rent for gas-stoves will be charged in the price of the gas, instead of separately, as hitherto. It is hoped to avoid much of the expense involved in taking-out stoves for which rent is overdue, or in the case of changes in tenancy. The Committee also decided to make a charge for the use of large meters in connection with furnaces and foundries where hitherto the amount of gas consumed has not been such as to justify the size of the meter—a trouble that has involved financial loss to the department for a good many years.

Refusing Access to a Meter Inspector.—Stephen Bentley, of Mill Street, Bridgnorth, was summoned at Bridgnorth last week by the Mayor and Corporation (the gas undertakers) for hindering their officer from entering his house for the purpose of ascertaining the quantity of gas consumed. A second summons charged him with damaging the gas-meter and pipes, and a third summons alleged that he had unlawfully connected the meter to a pipe through which gas was supplied. It appeared from the evidence of two fitters in the employ of the Corporation that defendant refused them admission to his house on several occasions; and when eventually one named Jones was admitted, he found the meter damaged. After cutting-off the gas he kept observation on the house, and discovered that gas was being used for lighting. Defendant was fined £2 and costs in the first case, and 10s. and costs in the other two cases.

The Longridge Gas Company have reduced the price of gas used for street lighting from 4s. 2d. to 3s. 11½d. per 1000 c.ft.

The Helston Town Council have empowered a Special Committee to continue negotiations with the local Gas Company on the offer made by the latter to sell the undertaking to the Corporation.

The Edinburgh Corporation Gas Department have taken the opportunity of advertising various gas-appliances on the notices informing consumers of their Order under the Gas Regulation Act.

The Leeds depôt of the Welsbach Light Company, Ltd., has been removed to more extensive premises. The new address will be No. 46, Park Place, Leeds. In the showrooms, all Welsbach lines will be on view, and inspection of the new premises is cordially invited.

By some means gas accumulated in the underground cable system of the Post Office Department at Middlesbrough; and while the cables were under repair, on March 20, a blow lamp ignited the gas. The flame travelled underground for a hundred yards, and a manhole was blown up. Immediately afterwards there was another explosion thirty yards away, and paving stones were blown into the air.

A fire broke out last Friday week at the works of Benzol and By-Products, Ltd., Crigglestone, Wakefield. Smoke was seen issuing from a tank containing upwards of 10 tons of pitch; and it was found that the pitch was well alight, and in dangerous proximity to the naphthalene plant. The firm's own fire brigade did excellent work before being reinforced by the Wakefield brigade. The flames were soon suppressed, and the actual damage done was slight. The explanation of the outbreak is the overheating of the pitch.

The Brighton and Hove Gas Company held their staff dinner and dance at the Old Ship Hotel, Brighton, last Thursday evening. Mr. C. H. Rutter, M.Inst.C.E. (Chief Engineer and General Manager), presided. The Chairman said that when he first joined the Company, 37 years ago, the whole of the clerical staff numbered between 30 and 40. He had seen many remarkable developments since that time, and the staff now numbered about 150. No Company could have a better staff than had theirs. During the evening an excellent musical programme was enjoyed.

For NOTICES TO CORRESPONDENTS, ADVERTISERS, AND SUBSCRIBERS

See last week's "JOURNAL," p. 804.

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